

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

MAT-7872US

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/446790

INTERNATIONAL APPLICATION NO.
PCT/JP98/02882INTERNATIONAL FILING DATE
26 June 1998 (26.06.98)PRIORITY DATE CLAIMED
27 June 1997 (27.06.97)

TITLE OF INVENTION

VIDEO SIGNAL RECORDER/REPRODUCER AND VIDEO SIGNAL REPRODUCER

APPLICANT(S) FOR DO/EO/US

Masaji UENO

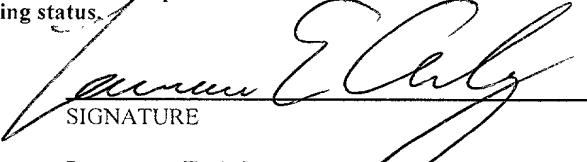
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. has been transmitted by the International Bureau
 - c. is not required, as the application was filed in the United States Receiving Office (RO/US)
6. A translation of the International Application into English (35 U.S.C. 371(c)(2))
7. A copy of the International Search Report (PCT/ISA/210).
8. Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. have been transmitted by the International Bureau.
 - c. have not been made; however, the time limit for making such amendments has NOT expired.
 - d. have not been made and will not be made.
9. A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:

13. An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. A **FIRST** preliminary amendment.
A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. A substitute specification.
17. A change of power of attorney and/or address letter.
18. Certificate of Mailing by Express Mail
19. Other items or information:

Marked-up specification showing additions and deletions.

U.S. APPLICATION NO (IF KNOWN, SEE 37 CFR 09/446790	INTERNATIONAL APPLICATION NO. PCT/JP98/02882	ATTORNEY'S DOCKET NUMBER MAT-7872US																			
20. The following fees are submitted:		CALCULATIONS PTO USE ONLY																			
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :																					
<input checked="" type="checkbox"/> Search Report has been prepared by the EPO or JPO \$840.00 <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) \$670.00 <input type="checkbox"/> No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) \$760.00 <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$970.00 <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) \$96.00																					
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Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)).		<input type="checkbox"/> 20 <input type="checkbox"/> 30 \$0.00																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">CLAIMS</th> <th style="width: 25%;">NUMBER FILED</th> <th style="width: 25%;">NUMBER EXTRA</th> <th style="width: 25%;">RATE</th> </tr> </thead> <tbody> <tr> <td>Total claims</td> <td>10 - 20 =</td> <td>0</td> <td>x \$18.00 \$0.00</td> </tr> <tr> <td>Independent claims</td> <td>4 - 3 =</td> <td>1</td> <td>x \$78.00 \$78.00</td> </tr> <tr> <td colspan="2">Multiple Dependent Claims (check if applicable).</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;">\$0.00</td> </tr> <tr> <td colspan="2" style="text-align: center;">TOTAL OF ABOVE CALCULATIONS =</td> <td style="text-align: center;">\$918.00</td> </tr> </tbody> </table>		CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	Total claims	10 - 20 =	0	x \$18.00 \$0.00	Independent claims	4 - 3 =	1	x \$78.00 \$78.00	Multiple Dependent Claims (check if applicable).		<input type="checkbox"/>	\$0.00	TOTAL OF ABOVE CALCULATIONS =		\$918.00	
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Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).		<input type="checkbox"/> \$0.00																			
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NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.																					
SEND ALL CORRESPONDENCE TO: <div style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> Lawrence E. Ashery Ratner & Prestia P.O. Box 980 Valley Forge, PA 19482 (610) 407-0700 </div> <div style="text-align: right; margin-bottom: 10px;">  SIGNATURE </div> <div style="text-align: right; margin-bottom: 10px;"> Lawrence E. Ashery NAME </div> <div style="text-align: right; margin-bottom: 10px;"> 34,515 REGISTRATION NUMBER </div> <div style="text-align: right; margin-bottom: 10px;"> December 27, 1999 DATE </div>																					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: M. Ueno : Art Unit:
Serial No.: To Be Assigned : Examiner:
Filed: Herewith :
FOR: VIDEO SIGNAL :
RECORDER/REPRODUCER AND VIDEO :
SIGNAL REPRODUCER

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

SIR:

Prior to examination, please amend the above-identified application as follows:

IN THE TITLE:

Please delete the title in its entirety and substitute therefore
--VIDEO SIGNAL RECORDING AND REPRODUCTION DEVICE AND
VIDEO SIGNAL REPRODUCTION DEVICE--.

IN THE SPECIFICATION:

After the title and before the first paragraph, please insert --THIS APPLICATION IS A U.S. NATIONAL PHASE APPLICATION OF PCT INTERNATIONAL APPLICATION PCT/JP98/02882--.

Please enter the substitute specification as attached hereto. Also enclosed is marked-up copy of the substitute specification showing additions and deletions.

IN THE DRAWINGS:

Please delete page "15/15" of the drawings, also labeled as "Reference Numerals" in its entirety.

Please approve the changes to the drawings as shown in the red ink sketches submitted herewith.

IN THE CLAIMS:

Please amend the claims as follows:

1 2. (Amended) A video signal reproduction device comprising:
2 luminance signal reproduction means for reproducing a
3 luminance signal from a recording medium;
4 first color difference signal reproduction means for reproducing
5 a first color difference signal from the recording medium;
6 second color difference signal reproduction means for
7 reproducing a second color difference signal from the recording medium;
8 color signal encoding means for converting said first color
9 difference signal output from said first color difference signal reproduction
10 means and said second color difference signal output from said second color
11 difference signal reproduction means into a carrier color signal;
12 adding means for adding said luminance signal output from said
13 luminance signal reproduction means and said carrier color signal output
14 from said color signal encoding means, and outputting a composite video
15 signal;
16 a luminance signal output terminal for outputting both said[;
17 a first color difference signal output terminal; and
18 a second color difference signal output terminal,

19 wherein said] luminance signal and said[output terminal is used
20 commonly as a] composite video signal [output terminal].

1 4. (Amended) A video signal recording and reproduction device
2 comprising:

3 a first signal input terminal for inputting a luminance signal;

4 a second signal input terminal for inputting a first color
5 difference signal;

6 a third signal input terminal for inputting a second color
7 difference signal;

8 YC separation means for separating and outputting another
9 luminance signal and a carrier color signal from a composite video signal;
10 and

11 color difference decoding means for inputting said carrier color
12 signal output from said YC separation means, and decoding and outputting
13 another first color difference signal and another second color difference
14 signal;

15 first switching means for inputting said luminance signal input
16 from said first signal input terminal and said another luminance signal output
17 from said YC separation means, and outputting one of said signals input
18 therein;

19 second switching means for inputting said first color difference
20 signal input from said second signal input terminal and said another first
21 color difference signal output by said color difference decoding means, and
22 outputting one of said signals input therein;

23 third switching means for inputting said second color difference
24 signal input from said third signal input terminal and said another second

25 color difference signal output by said color difference decoding means, and
26 outputting one of said signals input therein; and
27 signal switching control means for outputting a signal for
28 switching outputs of said first switching means, said second switching means
29 and said third switching means,
30 wherein one terminal among said first signal input terminal,
31 said second signal input terminal and said third signal input terminal also
32 receives [is used commonly as a] composite video signal[input terminal].

1 5. (Amended) The video signal recording and reproduction
2 device according to claim 4, further comprising switching means connected
3 between said one terminal which also receives said [commonly used as a]
4 composite video signal [input terminal] and an input terminal of said YC
5 separation means, for performing an ON/OFF operation according to said
6 signal output by said signal switching control means.

1 6. (Amended) The video signal recording and reproduction
2 device according to claim 4, wherein said one terminal which also receives
3 said [commonly used as a] composite video signal input terminal is connected
4 directly to an input terminal of said YC separation means.

1 7. (Amended) A video signal recording and reproduction device
2 comprising:
3 a first signal input terminal for inputting a luminance signal;
4 a second signal input terminal for inputting a first color
5 difference signal;
6 a third signal input terminal for inputting a second color

7 difference signal;

8 YC separation means for separating and outputting another
9 luminance signal and a carrier color signal from a composite video signal;
10 and

11 color difference decoding means for inputting said carrier color
12 signal output from said YC separation means, and decoding and outputting
13 another first color difference signal and another second color difference
14 signal;

15 input signal switching means provided between one terminal
16 [commonly used as a composite video signal input terminal and an input
17 terminal of said YC separation means,] selected from said first signal input
18 terminal, said second signal input terminal and said third signal input
19 terminal[;], said one terminal used for receiving said composite video signal
20 for said YC separation means;

21 switching means for inputting a component video signal input in
22 said one terminal [commonly] used for receiving said [as a] composite video
23 signal [input terminal] and one of an output signal of said YC separation
24 means and an output signal of said color difference decoding means, and
25 outputting one of the signals input therein; and

26 signal switching control means for outputting a signal for
27 switching said input signal switching means and said switching means.

28 [wherein said one terminal among said first signal input
29 terminal, said second signal input terminal and said third signal input
30 terminal is used commonly as a composite video signal input terminal.]

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1 8. (Amended) A video signal recording and reproduction device
2 comprising:

3 a first signal input terminal for inputting a luminance signal;
4 a second signal input terminal for inputting a first color
5 difference signal;

6 a third signal input terminal for inputting a second color
7 difference signal;

8 YC separation means for separating another luminance signal
9 and a carrier color signal from a composite video signal, and outputting said
10 separated signals; and

11 color difference decoding means for inputting said carrier color
12 signal output by said YC separation means, and decoding and outputting
13 another first color difference signal and another second color difference
14 signal;

15 input signal switching means for outputting a signal input in one
16 terminal [commonly used as a] used for receiving said composite video signal
17 input terminal, to one of said YC separation means and video signal
18 recording means, said one terminal is selected from said first signal input
19 terminal, said second signal input terminal and said third signal input
20 terminal; and

21 signal switching control means for outputting a signal for
22 switching said input signal switching means.

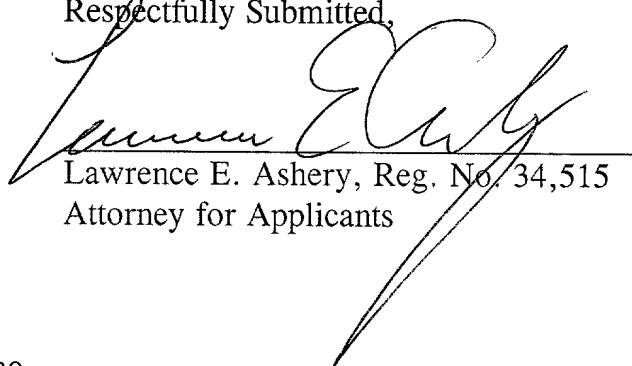
23 [wherein said one terminal among said first signal input
24 terminal, said second signal input terminal and said third signal input
25 terminal is used commonly as a composite video signal input terminal.]

1 11. (Amended) The video signal reproduction device
2 according to claim 2, further comprising:

3 first switching means provided between an output terminal of
4 said first color difference signal reproduction means and an input terminal of

5 said color signal encoding means for turning on and off an output signal of
6 said first color difference signal reproduction means;
7 second switching means provided between an output terminal of
8 said second color difference signal reproduction means and an input terminal
9 of said color signal encoding means for turning on and off an output signal of
10 said second color difference signal reproduction means; and
11 output signal switching control means for controlling said first
12 switching means and said second switching means.

Respectfully Submitted,



Lawrence E. Ashery, Reg. No. 34,515
Attorney for Applicants

LEA/dlm

Dated: December 27, 1999
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Valley Forge, PA 19482-0980
(610) 407-0700

The Assistant Commissioner for Patents is
hereby authorized to charge payment to Deposit
Account No. 18-0350 of any fees associated
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Date of Deposit: December 27, 1999

I hereby certify that this paper and fee are being deposited, under 37 C.F.R. § 1.10 and with sufficient postage, using the "Express Mail Post Office to Addressee" service of the United States Postal Service on the date indicated above and that the deposit is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.



Kathleen Libby

VIDEO SIGNAL RECORDING AND REPRODUCTION DEVICE AND VIDEO SIGNAL REPRODUCTION DEVICE

FIELD OF THE INVENTION

The present invention relates to a video signal recording and reproduction device and a video signal reproduction device that processes component video signals and composite video signals.

BACKGROUND OF THE INVENTION

A video signal recording and reproduction device and a video signal reproduction device (hereinafter referred to as "video device") of the prior art capable of handling an input and an output of two types of video signals, i.e. component video signal and composite video signal, are provided with a total of eight input and output terminals. There are three input terminals for the component video signal, one input terminal for the composite video signal, three output terminals for the component video signal, and one output terminal for the composite video signal.

Referring to a block diagram of a video device of the prior art in Fig. 13, described hereinafter will pertain to switching of an input signal. A composite video signal "CV" input to a composite video signal input terminal 131 is separated into a luminance signal "Y" and a carrier color signal "C" by a YC separation circuit 135. A luminance signal input terminal 156 receives an input of component luminance signal. A first switching device 137 receives the luminance signal, which

is input through the luminance signal input terminal 156, at an "A" terminal, and the luminance signal output "Y", which is output by the YC separation circuit 135, at a "B" terminal. The first switching device 137 then produces an output by selecting either of the "A" terminal and the "B" terminal. A B-Y signal input terminal 132 receives an input of color difference signal, or a B-Y signal, and an R-Y signal input terminal 133 receives an input of color difference signal, or an R-Y signal. A color difference decoder circuit 136 converts the carrier color signal output "C" produced by the YC separation circuit 135 into two color difference signals, i.e. an R-Y signal and a B-Y signal. A second switching device 138 receives the B-Y signal, which is output by the color difference decoder circuit 136, at a "B" terminal, and the component B-Y signal, which is input through the B-Y signal input terminal 132, at an "A" terminal. The second switching device 138 then produces an output by selecting either of the "A" terminal and the "B" terminal. A third switching device 139 receives the R-Y signal, which is output by the color difference decoder circuit 136, at a "B" terminal, and the component R-Y signal, which is input to the R-Y signal input terminal 133, at an "A" terminal. The third switching device 139 then produces an output by selecting either of the "A" terminal and the "B" terminal. An input signal switching control circuit 134 controls the switching devices 137 through 139. A video signal recording circuit 140 records the signals that are output by the individual switching devices into a recording medium.

The video signal recording and reproduction device of the prior art operates in a manner, which will be described hereinafter by referring to Fig. 13. A component video signal includes a component luminance signal, a component B-Y signal, and a component R-Y signal.

When the component video signal is input to the video signal recording and reproduction device, the component luminance signal "Y" is input to the luminance signal input terminal 156, the component B-Y signal is input to the B-Y signal input terminal 132, and the component R-Y signal is input to the R-Y

signal input terminal 133 respectively.

The input signal switching control circuit 134 is operated to select inputs at "A" sides of the input terminals of the switching devices 137 through 139. The selected component luminance signal, the component B-Y signal and the component R-Y signal are output to the video signal recording circuit 140, and individual signals are recorded in the recording medium.

When composite video signal is input to the video recording and reproduction device, the composite video signal "CV" is connected to the composite video signal input terminal 131.

The input signal switching control circuit 134 is operated to select inputs at "B" sides of the input terminals of the switching devices 137 through 139. The luminance signal "Y" separated by the YC separation circuit 135 from the composite video signal "CV", and the B-Y signal and the R-Y signal converted by the color difference decoder circuit 136 are output to the video signal recording circuit 140, and these signals are recorded in the recording medium.

With reference to a block diagram of a video device of the prior art in Fig. 14, the description next pertains to switching of an output signal. A luminance signal reproduction circuit 142 reproduces the luminance signal "Y" from the recording medium. A B-Y signal reproduction circuit 147 reproduces the B-Y signal from the recording medium. An R-Y signal reproduction circuit 148 reproduces the R-Y signal from the recording medium. A color signal encoder circuit 146 converts the B-Y signal and the R-Y signal output respectively by the B-Y signal reproduction circuit 147 and the R-Y signal reproduction circuit 148 into a carrier color signal "C". An adder circuit 143 produces and outputs a composite video signal "CV" by adding the luminance signal output by the luminance signal reproduction circuit 142 and the carrier color signal "C" output by the color signal encoder circuit 146. A first output amplifier circuit 145 amplifies an output of the

adder circuit 143, and outputs it to a composite video signal output terminal 151. A second output amplifier circuit 149 amplifies an output signal of the B-Y signal reproduction circuit 147, and outputs it to a B-Y signal output terminal 152. A third output amplifier circuit 150 amplifies an output signal of the R-Y signal reproduction circuit 148, and outputs it to an R-Y signal output terminal 153. A fourth output amplifier circuit 154 amplifies a luminance signal output of the luminance signal reproduction circuit 142, and outputs it to a luminance signal output terminal 155.

Referring to Fig. 14, the video signal recording and reproduction device of the prior art operates in a manner as described hereinafter. First, an operation of the video signal recording and reproduction device to output a component video signal will be described as follows.

The luminance signal “Y” reproduced by the luminance signal reproduction circuit 142 is amplified by the fourth output amplifier circuit 154, and it is output from the luminance signal output terminal 155 as a component luminance signal. The B-Y signal reproduced by the B-Y signal reproduction circuit 147 is amplified by the second output amplifier circuit 149, and it is output from the B-Y signal output terminal 152 as a component B-Y signal. In the same manner, the R-Y signal reproduced by the R-Y signal reproduction circuit 148 is output from the R-Y signal output terminal 153 as a component R-Y signal.

Next, an operation of the video signal recording and reproduction device to output a composite video signal will be described.

The color signal encoder circuit 146 receives the B-Y signal output from the B-Y signal reproduction circuit 147 and the R-Y signal output from the R-Y signal reproduction circuit 148, and converts these input signals into a carrier color signal “C”. The adder circuit 143 adds the carrier color signal “C” and the luminance signal “Y” reproduced by the luminance signal reproduction circuit 142.

The added signal is amplified by the first output amplifier circuit 145, and is output from the composite video signal output terminal 151 as the composite video signal.

As described above, the video signal recording and reproduction device of the prior art has typically been equipped with a total of eight input and output terminals, i.e. three input terminals for the component video signal, one input terminal for the composite video signal, three output terminals for the component video signal, and one output terminal for the composite video signal, in order to input and output both the component video signal and the composite video signal.

Therefore, the video signal recording and reproduction device may have held a large space needed for installation of these input and output terminals, thereby restraining the video signal recording and reproduction device from being reduced in size. The video signal recording and reproduction device has also included eight sets of signal cable connecting with each of the input and output terminals, which may restrict usable space within the device.

In addition, the video signal recording and reproduction device has desirably included an output amplifier circuit for each of the output terminals, giving rise to a problem that a scale of the circuitry is inevitably large, and therefore consuming a large electric power.

In recent years, a need arises for lessening the input and output terminals, and reducing the power consumption, since a demand exists for video signal recording and reproduction devices that are usable outdoors, small in size, and easy to carry.

SUMMARY OF THE INVENTION

A video signal recording and reproduction device makes use of one terminal out of a plurality of terminals for inputting component video signal to also serve as an input terminal for composite video signal, thereby the video signal

recording and reproduction device is capable of inputting both the component video signal and the composite video signal.

Furthermore, the video signal recording and reproduction device also makes use of one terminal out of a plurality of terminals for outputting component video signal to also serve as an output terminal for composite video signal, thereby the video signal recording and reproduction device is capable of outputting both the component video signal and the composite video signal.

Moreover, the video signal recording and reproduction device makes use of one terminal out of the plurality of terminals for inputting component video signal to serve commonly as an input terminal for composite video signal, and also another one terminal out of the plurality of terminals for outputting component video signal to serve commonly as an output terminal for composite video signal. This makes the video signal recording and reproduction device capable of inputting and outputting both the component video signal and the composite video signal.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram depicting a video signal recording and reproduction device of a first exemplary embodiment of the present invention;

Fig. 2 is a block diagram depicting a video signal recording and reproduction device of a second exemplary embodiment of the present invention;

Fig. 3 is a block diagram depicting a video signal recording and reproduction device of a third exemplary embodiment of the present invention;

Fig. 4 is a block diagram depicting a video signal recording and reproduction device of a fourth exemplary embodiment of the present invention;

Fig. 5 is a block diagram depicting a video signal recording and reproduction device of a fifth exemplary embodiment of the present invention;

Fig. 6 is a block diagram depicting a video signal recording and reproduction device of a sixth exemplary embodiment of the present invention;

Fig. 7 is a block diagram depicting a video signal recording and reproduction device of a seventh exemplary embodiment of the present invention;

Fig. 8 is a block diagram depicting a video signal recording and reproduction device of an eighth exemplary embodiment of the present invention;

Fig. 9 is a block diagram depicting a video signal recording and reproduction device of a ninth exemplary embodiment of the present invention;

Fig. 10 is a block diagram depicting a video signal recording and reproduction device of a tenth exemplary embodiment of the present invention;

Fig. 11 is a block diagram depicting a video signal recording and reproduction device of an eleventh exemplary embodiment of the present invention;

Fig. 12 is a block diagram depicting a video signal recording and reproduction device of a twelfth exemplary embodiment of the present invention;

Fig. 13 is a block diagram depicting a video signal recording and reproduction device of the prior art; and

Fig. 14 is a further block diagram relating to a video signal recording and reproduction device of the prior art.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

First exemplary embodiment

A video signal recording and reproduction device of a first exemplary embodiment of the present invention will be described hereinafter by referring to a

block diagram of Fig. 1.

The video signal recording and reproduction device of this exemplary embodiment is equipped with three input terminals to input video signals, i.e. a first signal input terminal 1, a second signal input terminal 2, and a third signal input terminal 3.

A YC separation circuit 5 separates a composite video signal into a luminance signal "CY" and a carrier color signal "CC", when it is input with the composite video signal. A luminance signal "Y" input to the first signal input terminal 1 is fed to an "A" terminal of a first switching device 7, and the luminance signal "CY" output by the YC separation circuit 5 is fed to a "B" terminal. A color difference decoder circuit 6 converts the carrier color signal output "CC", which is output by the YC separation circuit 5, into two color difference signals, a first color difference signal "CC1" and a second color difference signal "CC2". The first color difference signal "CC1" output by the color difference decoder circuit 6 is fed to a "B" terminal of a second switching device 8, and another first color difference signal "C1" input to the second signal input terminal 2 is fed to an "A" terminal of the second switching device 8. The second switching device 8 selects either one of the "C1" and the "CC1", and outputs it to a video signal recording circuit 10. The second color difference signal "CC2" output by the color difference decoder circuit 6 is fed to a "B" terminal of a third switching device 9, and another second color difference signal "C2" input to the third signal input terminal 3 is fed to an "A" terminal of the third switching device 9. The third switching device 9 selects either one of the "C2" and the "CC2", and outputs it to the video signal recording circuit 10. An input signal switching device 28 selects whether it outputs a signal fed in the first signal input terminal 1 to the YC separation circuit 5 or not. The video signal recording circuit 10 records the signals output from the first, the second and the third switching devices into a recording medium. A signal switching control circuit 4 controls the switching devices 7 through 9 and 28.

In the video signal recording and reproduction device of this exemplary embodiment, if the input video signal is a component video signal, the device inputs a component luminance signal “Y” to the first signal input terminal 1, a first component color difference signal “C1” (e.g. B-Y signal, U signal, I signal, and so on) to the second signal input terminal, and a second component color difference signal “C2” (e.g. R-Y signal, V signal, Q signal, and so on) to the third signal input terminal 3.

If the video signal input to it is a composite video signal, the device inputs the composite video signal into the first signal input terminal 1, but it does not input any signal to the second signal input terminal 2 and the third signal input terminal 3.

Described first is a case in which the device records the component video signal. The first signal input terminal 1, the second signal input terminal 2 and the third signal input terminal 3 are respectively input with the component luminance signal “Y”, the first component color difference signal “C1” and the second component color difference signal “C2”.

The signal switching control circuit 4 is operated to select input signals on the “A” side input terminals of the first through the third switching devices 7 through 9, and the “A” side output terminal of the input signal switching device 28. An output of the input signal switching device 28 is open, because no connection is provided with the “A” side output terminal of the input signal switching device 28.

The first switching device 7, the second switching device 8 and the third switching device 9 output the component luminance signal “Y” input through the first signal input terminal 1, the first component color difference signal “C1” input through the second signal input terminal 2 and the second component color difference signal “C2” input through the third signal input terminal 3 respectively to

the video signal recording circuit 10. The video signal recording circuit 10 receives the component luminance signal "Y", the first component color difference signal "C1" and the second component color difference signal "C2", and records these signals in the recording medium.

Described next is a case in which the device records a composite video signal. The first signal input terminal 1 is input with the composite video signal, and the signal switching control circuit 4 is operated to select input signals on the "B" side input terminals of the first through the third switching devices 7 through 9, and an output signal on the "B" side output terminal of the input signal switching device 28.

A common terminal of the input signal switching device 28 is connected to the first signal input terminal 1. The composite video signal input to the first signal input terminal 1 is fed to the YC separation circuit 5 through the input signal switching device 28, and separated into a luminance signal "CY" and a carrier color signal "CC". The separated luminance signal "CY" is forwarded to the "B" side terminal of the first switching device 7. The separated carrier color signal "CC" is converted into a first color difference signal "CC1" and a second color difference signal "CC2" in the color difference decoder circuit 6. The first color difference signal "CC1" is output to the "B" side terminal of the second switching device 8, and the second color difference signal "CC2" is output to the "B" side terminal of the third switching device 9.

In the manner as described, the video signal recording circuit 10 receives the luminance signal "CY" output by the YC separation circuit 5, and the first color difference signal "CC1" and the second color difference signal "CC2" output by the color difference decoder circuit 6, and records the signals into the recording medium.

As has been described, the video signal recording and reproduction

device of this exemplary embodiment desirably may need only three input terminals. Thus, the device is able to receive the video signal with a smaller number of the input terminals as compared to the four terminals needed by the conventional device, so as to provide an advantage of reducing a number of signal cables within the device.

Second exemplary embodiment

A video signal recording and reproduction device of a second exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 2.

The video signal recording and reproduction device of this exemplary embodiment is provided with the same structural elements as that of the first exemplary embodiment shown in Fig. 1. It differs in a respect that the common terminal of the input signal switching device 28 is connected to the second signal input terminal 2 in Fig. 2, whereas it is connected to the first signal input terminal 1 in Fig. 1.

The circuits operate in the same manner as that of the first exemplary embodiment, in the case of recording the component video signal, and description of which will therefore be skipped.

In the case of recording the composite video signal, the composite video signal is input to the second signal input terminal 2. The signal switching control circuit 4 is operated to select input signals on the "B" side input terminals of the first through the third switching devices 7 through 9, and the "B" side output terminal of the input signal switching device 28.

The video signal recording circuit 10 receives the luminance signal "CY" output by the YC separation circuit 5, and the first color difference signal "CC1" and the second color difference signal "CC2" output by the color difference

decoder circuit 6, and records the signals in the recording medium.

As has been described, the video signal recording and reproduction device of this exemplary embodiment desirably may need only three in number of the input terminals. The device is thus able to receive the video signal with a smaller number of the input terminals as compared to the four terminals needed by the conventional device, so as to provide an advantage of reducing a number of signal cables within the device.

According to the foregoing teaching of the first and the second exemplary embodiments, another circuit can be devised in a such structure that the common terminal of the input signal switching device 28 is connected to the third signal input terminal 3, and the composite video signal is input to the third signal input terminal 3.

As described above, any one of the plurality of input terminals for the component video signal can be used commonly as an input terminal for the composite video signal, in the video device of the present invention, which is capable of receiving inputs of both the component video signal and the composite video signal.

Third exemplary embodiment

A video signal recording and reproduction device of a third exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 3.

In Fig. 1 depicting the first exemplary embodiment, an input impedance of the YC separation circuit 5 connected to the input signal switching device 28 is substantially high as compared to a line impedance connected to it. Therefore, in the case that video signal is the component video signal, a signal on a line connected from the first signal input terminal 1 to the first switching device 7,

i.e. the component luminance signal, is not influenced by the YC separation circuit 5, even if the YC separation circuit 5 is connected to the line. Or, the effect is generally small enough to be negligible. Accordingly, it stands to reason that the input signal switching device 28 shown in Fig. 1 and Fig. 2 can be omitted.

Fig. 3 differs from Fig. 1 in a respect that the input signal switching device 28 is omitted in it. The device is composed of the same structural elements other than the above, and all connections among the individual structural elements are the same except for those related to the input signal switching device 28. In other words, in the video signal recording and reproduction device depicted in Fig. 3, the first signal input terminal 1 is connected directly to an input terminal of the YC separation circuit 5 without communicating through the input signal switching device 28, while the same first signal input terminal 1 is also connected to the "A" side input terminal of the first switching device 7. In Fig. 3, the same structural elements having the same operational function as those of Fig. 1 are assigned the same reference numerals. Further description about how the device of this exemplary embodiment operates will be omitted.

The video signal recording and reproduction device of this exemplary embodiment desirably may need only three input terminals. The device is thus able to receive the video signal with a smaller number of the input terminals as compared to the four terminals needed by the conventional device, so as to provide an advantage of reducing a number of signal cables within the device. Furthermore, the device has merit in avoiding use of the input signal switching device 28, as compared to that of the first exemplary embodiment.

Fourth exemplary embodiment

A video signal recording and reproduction device of a fourth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 4.

The video signal recording and reproduction device of this exemplary embodiment is composed of the same structural elements as that of Fig. 2 except that the input signal switching device 28 is omitted. All connections among the individual structural elements are identical except for those related to the input signal switching device 28. That is, in the video signal recording and reproduction device as depicted in Fig. 4, the second signal input terminal 2 is connected to an input terminal of the YC separation circuit 5, while it is also connected to the "A" side input terminal of the second switching device 8. In Fig. 4, the same structural elements having the same operational function as those of Fig. 2 are assigned the same reference numerals. Further description about how the device of this exemplary embodiment operates will be omitted, as it is obvious through the foregoing details.

The video signal recording and reproduction device of this exemplary embodiment desirably may need only three in number of the input terminals, thereby giving an advantage of reducing a number of signal cables within the device. Furthermore, the device provides merit in avoiding use of the input signal switching device 28, as compared to that of the second exemplary embodiment.

According to the above-described third and fourth exemplary embodiments, another circuit can be composed in the same manner so that the composite video signal is input to the third signal input terminal 3.

Fifth exemplary embodiment

A video signal recording and reproduction device of a fifth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 5. The video signal recording and reproduction device of Fig. 5 differs from that of Fig. 1 in a respect that the second switching device 8 and the third switching device 9 are omitted in it. The same structural elements having the same operational function as those of Fig. 1 are assigned the same reference

numerals.

An output impedance of the terminal for outputting the first color difference signal “CC1” and an output impedance of the terminal for outputting the second color difference signal “CC2” of the color difference decoder circuit 6 are substantially high as compared to impedance of respective lines connected thereto, when no signal is being output. Therefore, the first component color difference signal “C1” input to the second signal input terminal 2 and the second component color difference signal “C2” input to the third signal input terminal 3 are not influenced by the color difference decoder circuit 6.

The color difference decoder circuit 6 gives no effect or a negligible effect to the first component color difference signal “C1” and the second component color difference signal “C2”, even if the output terminal for the first color difference signal and the output terminal for the second color difference signal of the color difference decoder circuit 6 are connected respectively to the second signal input terminal and the third signal input terminal, as shown in Fig. 5, so long as no input signal is present in the color difference decoder circuit 6.

The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the input terminals, thereby giving an advantage of reducing a number of signal cables within the device. Furthermore, the device provides merit in avoiding use of the switching devices 8 and 9, as compared to the first exemplary embodiment.

Sixth exemplary embodiment

A video signal recording and reproduction device of a sixth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 6. The video signal recording and reproduction device of this exemplary embodiment has a circuit structure in which the first switching device 7

and the third switching device 9 are eliminated from that of Fig. 2. The same structural elements having the same operational function as those of Fig. 2 are assigned the same reference numerals.

Output impedance of the YC separation circuit 5 is substantially high as compared to impedance of a line connected to it, when no signal is being output. Therefore, the component luminance signal input from the first signal input terminal 1 is not influenced by the presence of the YC separation circuit 5.

The video signal recording and reproduction device of this exemplary embodiment desirably may need only three in number of the input terminals, thereby giving an advantage of reducing a number of signal cables within the device. Furthermore, the device provides merit in avoiding use of the switching devices 7 and 9, as compared to the second exemplary embodiment.

According to the foregoing fifth and sixth exemplary embodiments, another circuit can be composed in the same manner so that the composite video signal may be input to the third signal input terminal 3.

Seventh exemplary embodiment

A video signal recording and reproduction device of a seventh exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 7. The video signal recording and reproduction device of this exemplary embodiment has a structure in which the first switching device 7, the second switching device 8 and the third switching device 9 are eliminated from that of Fig. 1. Any structural elements having the same operational function as those of Fig. 1 are assigned the same reference numerals.

As has been described, an output impedance of the YC separation circuit 5 and an output impedance of the color difference decoder circuit 6 are substantially high as compared to impedance of the lines connected to them, when

no signal is being output. Therefore, the first switching device 7, the second switching device 8 and the third switching device 9 can be omitted from the structure of Fig. 1.

The video signal recording and reproduction device of this exemplary embodiment desirably may need only three in number of the input terminals, thereby giving an advantage of reducing a number of signal cables within the device. Furthermore, the device provides merit in avoiding use of the switching devices 7, 8 and 9, as compared to the first exemplary embodiment.

Eighth exemplary embodiment

A video signal recording and reproduction device of an eighth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 8. The video signal recording and reproduction device of this exemplary embodiment has a structure in which the first switching device 7, the second switching device 8 and the third switching device 9 are eliminated from that of Fig. 2. Any structural elements having the same operational function as those of Fig. 2 are assigned the same reference numerals.

As has been described, output impedance of the YC separation circuit 5 and the color difference decoder circuit 6 are substantially high as compared to impedance of the lines connected to them, when no signal is being output. Therefore, the first switching device 7, the second switching device 8 and the third switching device 9 can be omitted from the structure of Fig. 1.

The video signal recording and reproduction device of this exemplary embodiment desirably may need only three in number of the input terminals, thereby giving an advantage of reducing a number of signal cables within the device. Furthermore, the device provides merit in avoiding use of the switching devices 7, 8 and 9, as compared to the second exemplary embodiment.

According to the foregoing seventh and eighth exemplary embodiments, it is needless to note that another circuit can be composed in the same manner so that the composite video signal may be input to the third signal input terminal 3.

Ninth exemplary embodiment

A video signal recording and reproduction device of a ninth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 9.

A luminance signal reproduction circuit 12 reproduces a luminance signal "Y" from a recording medium. A first color difference signal reproduction circuit 17 reproduces a first color difference signal "C1" from the recording medium. A second color difference signal reproduction circuit 18 reproduces a second color difference signal "C2" from the recording medium. A color signal encoder circuit 16 receives inputs of the first color difference signal "C1" output by the first color difference signal reproduction circuit 17 and the second color difference signal "C2" output by the second color difference signal reproduction circuit 18, generates a carrier color signal "C", and outputs it to an adder circuit 13. The adder circuit 13 generates and outputs a composite video signal CV by adding the luminance signal "Y" output by the luminance signal reproduction circuit 12 and the carrier color signal "C" output by the color signal encoder circuit 16.

A switching device 14 receives an output Y of the luminance signal reproduction circuit 12 at an "A" side terminal and an output CV of the adder circuit 13 at an "B" side terminal, and outputs either one of the signals by selecting it. A first output amplifier circuit 15 amplifies the output of the switching device 14, and outputs it to a video signal output terminal 21. The video signal output terminal 21 outputs the output signal of the first output amplifier circuit 15 from the video signal recording and reproduction device. A second output amplifier circuit 19 amplifies

the output signal C1 of the first color difference signal reproduction circuit 17. A first color difference signal output terminal 22 outputs the output signal of the second output amplifier circuit 19 from the video signal recording and reproduction device. A third output amplifier circuit 20 amplifies the output signal C2 of the second color difference signal reproduction circuit 18. A second color difference signal output terminal 23 outputs the output signal produced by the third output amplifier circuit 20 from the video signal recording and reproduction device. An output signal switching control circuit 11 switches the signal output from the video signal output terminal 21 by controlling the switching device 14.

Described hereinafter is a case in which a component video signal is output from the video signal recording and reproduction device of this exemplary embodiment. The output signal switching control circuit 11 is operated to select the "A" side input terminal of the fifth switching device 14. A component luminance signal "Y" is output from the video signal output terminal 21. The first color difference signal "C1" output by the first color difference signal reproduction circuit 17 passes through the second output amplifier circuit 19, and is output from the first color difference signal output terminal 22, as a first component color difference signal. In the like manner, the second component color difference signal "C2" is output by the second color difference signal reproduction circuit 18, passes through the third output amplifier circuit 20, and is output from the second color difference signal output terminal 23.

Described next is a case in which a composite video signal is output from the video signal recording and reproduction device of this exemplary embodiment. The output signal switching control circuit 11 is operated to select the "B" side input terminal of the switching device 14. The color signal encoder circuit 16 receives inputs of the first color difference signal "C1" output by the first color difference signal reproduction circuit 17 and the second color difference signal "C2" output by the second color difference signal reproduction circuit 18, converts them

into a carrier color signal "C", and outputs it to the adder circuit 13. The adder circuit 13 generates and outputs a composite video signal "CV" by adding the luminance signal "Y" output by the luminance signal reproduction circuit 12 and the carrier color signal "C" output by the color signal encoder circuit 16. The composite video signal "CV" generated here passes through the fifth switching device 14 and the first output amplifier circuit 15, and is output from the video signal output terminal 21.

From the foregoing, it will be seen that the video signal recording and reproduction device of this exemplary embodiment makes use of the video signal output terminal 21 as a component luminance signal output terminal when it outputs a component video signal, or, as a composite video signal output terminal when it outputs a composite video signal.

In other words, the video signal recording and reproduction device of this exemplary embodiment unifies the component luminance signal output terminal and the composite video signal output terminal.

As has been described, the video signal recording and reproduction device of this exemplary embodiment desirably may need only three in number of the output terminals. Thus, the device is able to output the video signal with a smaller number of the output terminals than the conventional four terminals, so as to provide an advantage of reducing a number of signal cables and a number of output amplifier circuits in the device.

Tenth exemplary embodiment

A video signal recording and reproduction device of a tenth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 10.

The video signal recording and reproduction device of this exemplary

embodiment differs from that of the ninth exemplary embodiment in a respect that an output C1 of the first color difference signal reproduction circuit 17 is connected to the "A" side input terminal of the switching device 14, an output CV of the adder circuit 13 is connected to the "B" side input terminal, and an input terminal of the second output amplifier circuit 19 is connected to a common terminal of the switching device 14.

In this exemplary embodiment, the video signal output terminal 22 is utilized as a first component color difference signal output terminal when the video signal output terminal 22 outputs a component video signal. Also, the video signal output terminal 22 is utilized as a composite video signal output terminal when the video signal output terminal 22 outputs a composite video signal.

The video signal recording and reproduction device of this exemplary embodiment operates in the same manner as that of the ninth exemplary embodiment, and description of which will therefore be skipped. The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the output terminals. Thus, the device is able to output the video signal with a smaller number of the output terminals than the conventional four terminals, so as to provide an advantage of reducing a number of signal cables and a number of output amplifier circuits in the device.

Based on the foregoing ninth and the tenth exemplary embodiments, another circuit can be devised in such a structure that an output of the second color difference signal reproduction circuit 18 is connected to the "A" side input terminal of the switching device 14, an output of the adder circuit 13 is connected to the "B" side input terminal, and the input terminal of the third output amplifier circuit 20 is connected to the common terminal of the switching device 14.

Eleventh exemplary embodiment

A video signal recording and reproduction device of an eleventh exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 11.

In Fig. 11, all of the structural elements, except for a switch 27, are identical to those of the ninth exemplary embodiment. Since the structural elements carrying the same reference numerals operate in the same manner, their description will be skipped.

Described hereinafter is a case in that a composite video signal is output. The output signal switching control circuit 11 is operated to turn on the switch 27. The adder circuit 13 generates a composite video signal by adding a luminance signal "Y" output by the luminance signal reproduction circuit 12 and a carrier color signal "C" output by the color signal encoder circuit 16. The composite video signal is amplified by the first output amplifier circuit 15, and is output from the video signal output terminal 21.

Described now is a case in which a component video signal is output. The output signal switching control circuit 11 is operated to turn off the switch 27. Since the carrier color signal is not supplied to the adder circuit 13, the output signal from the luminance signal reproduction circuit 12 passes through the adder circuit 13 without being added up, and is output as the component luminance signal from the video signal output terminal 21, after amplified by the first output amplifier circuit 15.

A first component color difference signal "C1" is output from the first color difference signal reproduction circuit 17, amplified by the second output amplifier circuit 19, and is then output from the first color difference signal output terminal 22.

In like manner, a second component color difference signal "C2" is

output by the second color difference signal reproduction circuit 18, amplified by the third output amplifier circuit 20, and is output from the second color difference signal output terminal 23.

The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the output terminals. Thus, the device is able to output the video signal with a smaller number of the output terminals as compared to the conventional four terminals, thereby having an advantage of reducing a number of signal cables and a number of output amplifier circuits in the device.

Twelfth exemplary embodiment

A video signal recording and reproduction device of a twelfth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 12.

The video signal recording and reproduction device of this exemplary embodiment differs from that of the eleventh exemplary embodiment in a respect that two switches 27a and 27b are provided at an input side of the color difference encoder circuit in Fig. 12, whereas the switch 27 is provided at an output side of the color difference encoder circuit in Fig. 11. All of the other structural elements are identical to those of the tenth exemplary embodiment. Since the structural elements carrying the same reference numerals operate in the same manner, their description will be skipped.

Described hereinafter is a case in that a composite video signal is output. The output signal switching control circuit 11 is operated to turn on the switches 27a and 27b. The adder circuit 13 generates a composite video signal by adding a luminance signal "Y" output by the luminance signal reproduction circuit 12 and a carrier color signal "C" output by the color signal encoder circuit 16. The

composite video signal is amplified by the first output amplifier circuit 15, and is output from the video signal output terminal 21.

Described now is a case in which a component video signal is output. The output signal switching control circuit 11 is operated to turn off the switches 27a and 27b. Since the carrier color signal is not supplied to the adder circuit 13, the output signal from the luminance signal reproduction circuit 12 passes through the adder circuit 13 without being added up, and it is output as being the component luminance signal from the video signal output terminal 21, after amplified by the first output amplifier circuit 15.

A first component color difference signal "C1" is output from the first color difference signal reproduction circuit 17, amplified by the second output amplifier circuit 19, and is then output from the first color difference signal output terminal 22.

In like manner, a second component color difference signal "C2" is output by the second color difference signal reproduction circuit 18, amplified by the third output amplifier circuit 20, and is output from the second color difference signal output terminal 23.

The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the output terminals. Thus, the device is able to output the video signal with a smaller number of the output terminals as compared to the conventional four terminals, thereby having an advantage of reducing a number of signal cables and a number of output amplifier circuits in the device.

As has been described, the present invention provide an expedient advantage of making a video signal recording and reproduction device capable of inputting and outputting both component video signal and composite video signal

with a reduced number of input/output connectors, thereby realizing a reduction in size, a reduction in cost, as well as a reduction of power consumption.

In addition, the device provides even greater effectiveness, when it employs a combination of any of the switching schemes for video input signal described in the first through eighth exemplary embodiments, together with another one of the switching schemes for video output signal described in the ninth through twelfth exemplary embodiments.

Although the switching schemes for output signal described in the ninth through twelfth exemplary embodiments have been represented by the video signal recording and reproduction device, they are adaptable to video signal reproduction devices not equipped with a recording function.

Although the foregoing exemplary embodiments have been described in the structure of hardware circuits, all or a part of the function of the structural elements can be realized by a software, except for the terminals. Furthermore, the present invention can be embodied in a variety of modified forms. Accordingly, it should be understood that all modifications falling within the true spirit and scope of this invention are covered by the appended claims.

ABSTRACT OF THE DISCLOSURE

A video signal recording and reproduction device of this invention uses one of a plurality of terminals for receiving input of component video signal to also serve as a composite video signal input terminal, thereby reducing a number of 5 the input terminals. This realizes a reduction in size of the device, yet maintains the device to be capable of receiving both inputs of component video signal and composite video signal. The video signal recording and reproduction device of this invention also uses one of a plurality of terminals for outputting component video signal to also serve as a composite video signal output terminal, thereby 10 reducing a number of the output terminals. This realizes a further reduction in size of the device, yet maintains the device to be capable of providing both outputs of component video signal and composite video signal.

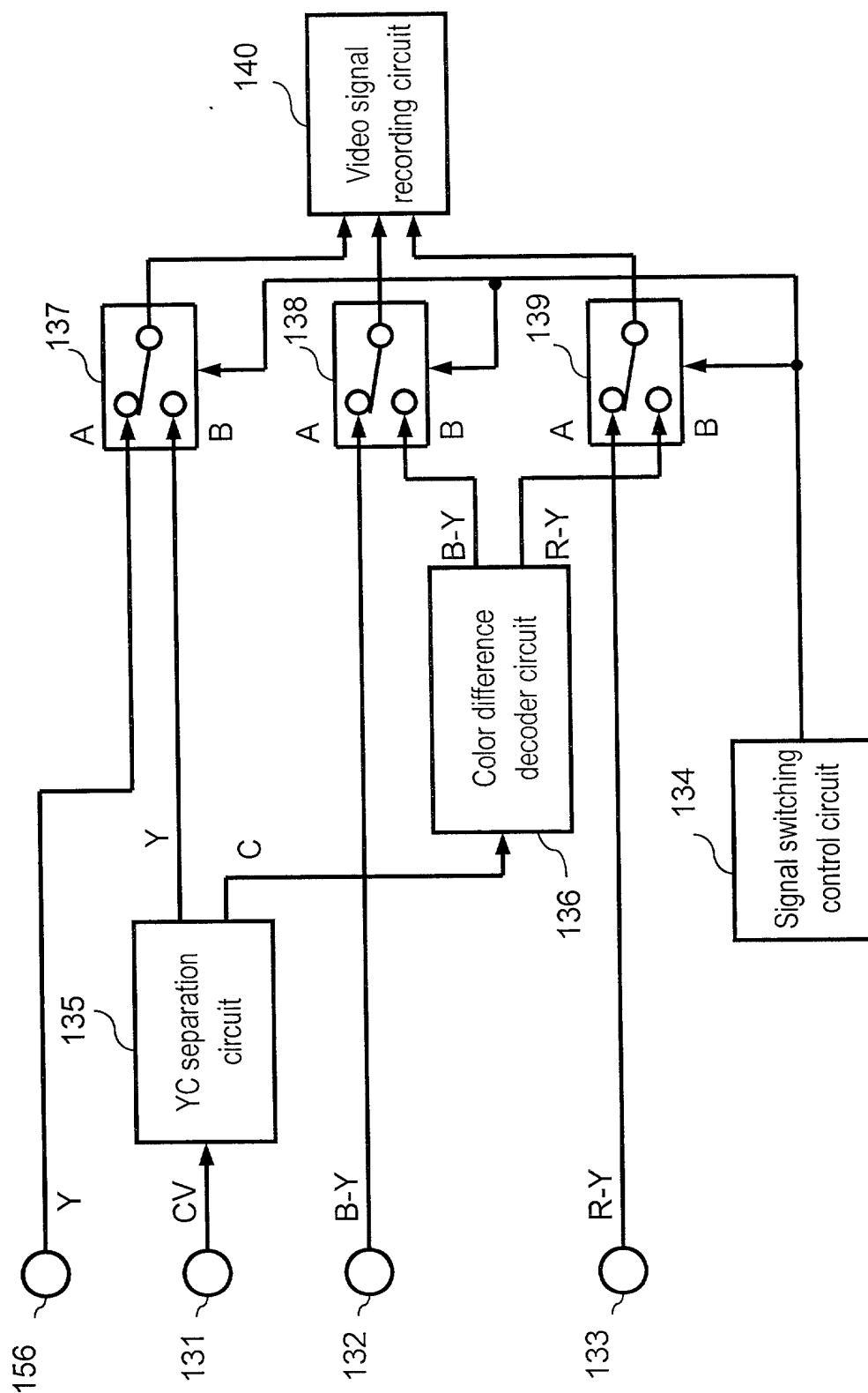


FIG. 13 PRIOR ART

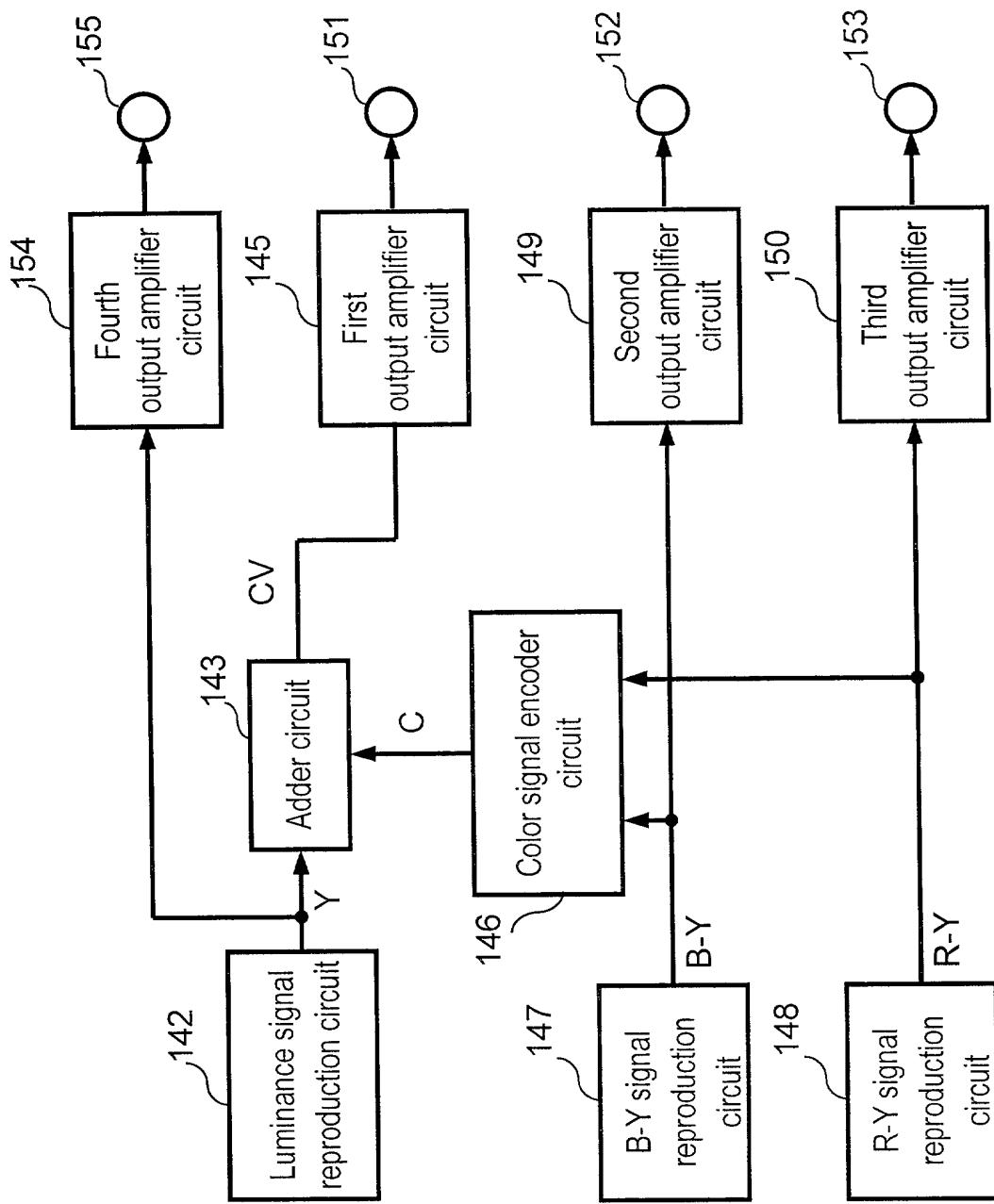


FIG. 14 PRIOR ART

VIDEO SIGNAL RECORDING AND REPRODUCTION DEVICE
AND VIDEO SIGNAL REPRODUCTION DEVICE

FIELD OF THE INVENTION

5 The present invention relates to a video signal recording and reproduction device and a video signal reproduction device that process component video signals and composite video signals.

BACKGROUND OF THE INVENTION

10 A video signal recording and reproduction device and a video signal reproduction device (hereinafter referred to as "video device") of the prior art capable of handling an input and an output of two types of video signals, i.e. component video signal and composite video signal, are provided with a total of eight input and output terminals. There are three for input terminals of the
15 component video signal, one for input terminal of the composite video signal, three for output terminals of the component video signal, and one for output terminal of the composite video signal.

Referring to a block diagram of a video device of the prior art in Fig. 13, described hereinafter will pertain to switching of an input signal. A composite 20 video signal "CV" input to a composite video signal input terminal 131 is separated into a luminance signal "Y" and a carrier color signal "C" by a YC separation circuit 135. A luminance signal input terminal 156 receives an input of component luminance signal. A first switching device 137 receives the luminance signal, which is input through the luminance signal input terminal 156, at an "A" terminal, 25 and the luminance signal output "Y", which is output by the YC separation circuit

135, at a "B" terminal. The first switching device 137 then produces an output by selecting either of the "A" terminal and the "B" terminal. A B-Y signal input terminal 132 receives an input of color difference signal, or a B-Y signal, and an R-Y signal input terminal 133 receives an input of color difference signal, or an R-Y signal. A color difference decoder circuit 136 converts the carrier color signal output "C" produced by the YC separation circuit 135 into two color difference signals, i.e. an R-Y signal and a B-Y signal. A second switching device 138 receives the B-Y signal, which is output by the color difference decoder circuit 136, at a "B" terminal, and the component B-Y signal, which is input through the B-Y signal input terminal 132, at an "A" terminal. The second switching device 138 then produces an output by selecting either of the "A" terminal and the "B" terminal. A third switching device 139 receives the R-Y signal, which is output by the color difference decoder circuit 136, at a "B" terminal, and the component R-Y signal, which is input to the R-Y signal input terminal 133, at an "A" terminal. The third switching device 139 then produces an output by selecting either of the "A" terminal and the "B" terminal. An input signal switching control circuit 134 controls the switching devices 137 through 139. A video signal recording circuit 140 records the signals that are output by the individual switching devices into a recording medium.

20 The video signal recording and reproduction device of the prior art operates in a manner, which will be described hereinafter by referring to Fig. 13. A component video signal includes a component luminance signal, a component B-Y signal, and a component R-Y signal.

25 When the component video signal is input to the video signal recording and reproduction device, the component luminance signal "Y" is input to

the luminance signal input terminal 156, the component B-Y signal is input to the B-Y signal input terminal 132, and the component R-Y signal is input to the R-Y signal input terminal 133 respectively.

The input signal switching control circuit 134 is operated to select 5 inputs at "A" sides of the input terminals of the switching devices 137 through 139. The selected component luminance signal, the component B-Y signal and the component R-Y signal are output to the video signal recording circuit 140, and individual signals are recorded in the recording medium.

When composite video signal is input to the video recording and 10 reproduction device, the composite video signal "CV" is connected to the video signal input terminal 131.

The input signal switching control circuit 134 is operated to select inputs at "B" sides of the input terminals of the switching devices 137 through 139. The luminance signal "Y" separated by the YC separation circuit 135 from the 15 composite video signal "CV", and the B-Y signal and the R-Y signal converted by the color difference decoder circuit 136 are output to the video signal recording circuit 140, and these signals are recorded in the recording medium.

With reference to a block diagram of a video device of the prior art in Fig. 14, described next pertains to switching of an output signal. A luminance 20 signal reproduction circuit 142 reproduces the luminance signal "Y" from the recording medium. A B-Y signal reproduction circuit 147 reproduces the B-Y signal from the recording medium. An R-Y signal reproduction circuit 148 reproduces the R-Y signal from the recording medium. A color signal encoder circuit 146 converts the B-Y signal and the R-Y signal output respectively by the B- 25 Y signal reproduction circuit 147 and the R-Y signal reproduction circuit 148 into a

carrier color signal "C". An adder circuit 143 produces and outputs a composite video signal "CV" by adding the luminance signal output by the luminance signal reproduction circuit 142 and the carrier color signal "C" output by the color signal encoder circuit 146. A first output amplifier circuit 145 amplifies an output of the 5 adder circuit 143, and outputs it to a composite video signal output terminal 151. A second output amplifier circuit 149 amplifies an output signal of the B-Y signal reproduction circuit 147, and outputs it to a B-Y signal output terminal 152. A third output amplifier circuit 150 amplifies an output signal of the R-Y signal reproduction circuit 148, and outputs it to a signal output terminal 153. A fourth 10 output amplifier circuit 154 amplifies a luminance signal output of the luminance signal reproduction circuit 142, and outputs it to a luminance signal output terminal 155.

Referring to Fig. 14, the video signal recording and reproduction device of the prior art operates in a manner as described hereinafter. First, an 15 operation of the video signal recording and reproduction device to output a component video signal will be described as follows.

The luminance signal "Y" reproduced by the luminance signal reproduction circuit 142 is amplified by the fourth output amplifier 154, and it is output from the luminance signal output terminal 155 as a component luminance 20 signal. The B-Y signal reproduced by the B-Y signal reproduction circuit 147 is amplified by the second output amplifier circuit 149, and it is output from the B-Y signal output terminal 152 as a component B-Y signal. In the same manner, the R-Y signal reproduced by the R-Y signal reproduction circuit 147 is output from the R-Y signal output terminal 153 as a component R-Y signal.

25 Next, an operation of the video signal recording and reproduction

device to output a composite video signal will be described.

The color signal encoder circuit 146 receives the B-Y signal output from the B-Y signal reproduction circuit 147 and the R-Y signal output from the R-Y signal reproduction circuit 148, and converts these input signals into a carrier 5 color signal "C". The adder circuit 143 adds the carrier color signal "C" and the luminance signal "Y" reproduced by the luminance signal reproduction circuit 142. The added signal is amplified by the first output amplifier circuit 145, and is output from the video signal output terminal 151 as the composite video signal.

As described above, the video signal recording and reproduction 10 device of the prior art has required to equip with a total of eight input and output terminals, i.e. three for input terminals of the component video signal, one for input terminal of the composite video signal, three for output terminals of the component video signal, and one for output terminal of the composite video signal, in order to input and output both the component video signal and the composite video signal.

15 Therefore, the video signal recording and reproduction device has held a large space needed for installation of these input and output terminals, thereby restraining the video signal recording and reproduction device from being reduced in size. The video signal recording and reproduction device has also required eight sets of signal cable connecting with each of the input and output terminals, which 20 has restricted a usable space within the device.

In addition, the video signal recording and reproduction device has required an output amplifier circuit for each of the output terminals, giving rise to a problem that a scale of the circuitry is inevitably large, and therefore consuming a large electric power.

25 In recent years, a need arises for lessening the input and output

terminals, and reducing the power consumption, since a demand exists for video signal recording and reproduction devices that are usable outdoors, small in size, and easy to carry.

An object of the present invention is to provide a video signal recording and reproduction device and a video signal reproduction device that carry less input and output terminals for video signal, and are small in size and capable of cutting power consumption.

SUMMARY OF THE INVENTION

10 In order to solve the foregoing problems, a video signal recording and reproduction device of the present invention makes use of one terminal out of a plurality of terminals for inputting component video signal to also serve as an input terminal for composite video signal, thereby the video signal recording and reproduction device is capable of inputting both the component video signal and the
15 composite video signal.

Furthermore, the video signal recording and reproduction device of this invention also makes use of one terminal out of a plurality of terminals for outputting component video signal to also serve as an output terminal for composite video signal, thereby the video signal recording and reproduction device is capable
20 of outputting both the component video signal and the composite video signal.

Moreover, the video signal recording and reproduction device of this invention makes use of one terminal out of the plurality of terminals for inputting component video signal to serve commonly as an input terminal for composite video signal, and also another one terminal out of the plurality of terminals for
25 outputting component video signal to serve commonly as an output terminal for

composite video signal. This makes the video signal recording and reproduction device capable of inputting and outputting both the component video signal and the composite video signal.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram depicting an essential portion relating to an input of video signal in a video signal recording and reproduction device of a first exemplary embodiment of the present invention;

10 Fig. 2 is a block diagram depicting an essential portion relating to an input of video signal in a video signal recording and reproduction device of a second exemplary embodiment of the present invention;

Fig. 3 is a block diagram depicting an essential portion relating to an input of video signal in a video signal recording and reproduction device of a third exemplary embodiment of the present invention;

15 Fig. 4 is a block diagram depicting an essential portion relating to an input of video signal in a video signal recording and reproduction device of a fourth exemplary embodiment of the present invention;

20 Fig. 5 is a block diagram depicting an essential portion relating to an input of video signal in a video signal recording and reproduction device of a fifth exemplary embodiment of the present invention;

Fig. 6 is a block diagram depicting an essential portion relating to an input of video signal in a video signal recording and reproduction device of a sixth exemplary embodiment of the present invention;

25 Fig. 7 is a block diagram depicting an essential portion relating to an input of video signal in a video signal recording and reproduction device of a

seventh exemplary embodiment of the present invention;

Fig. 8 is a block diagram depicting an essential portion relating to an input of video signal in a video signal recording and reproduction device of an eighth exemplary embodiment of the present invention;

5 Fig. 9 is a block diagram depicting an essential portion relating to an output of video signal in a video signal recording and reproduction device of a ninth exemplary embodiment of the present invention;

Fig. 10 is a block diagram depicting an essential portion relating to an output of video signal in a video signal recording and reproduction device of a tenth exemplary embodiment of the present invention;

10 Fig. 11 is a block diagram depicting an essential portion relating to an output of video signal in a video signal recording and reproduction device of an eleventh exemplary embodiment of the present invention;

Fig. 12 is a block diagram depicting an essential portion relating to an output of video signal in a video signal recording and reproduction device of a twelfth exemplary embodiment of the present invention;

15 Fig. 13 is a block diagram depicting an essential portion relating to an input of video signal in a video signal recording and reproduction device of the prior art; and

20 Fig. 14 is a block diagram depicting an essential portion relating to an output of video signal in the video signal recording and reproduction device of the prior art.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A video signal recording and reproduction device of a first exemplary embodiment of the preset invention will be described hereinafter by referring to a block diagram of Fig. 1.

The video signal recording and reproduction device of this exemplary embodiment is equipped with three input terminals to input video signals, i.e. a first signal input terminal 1, a second signal input terminal 2, and a third signal input terminal 3.

A YC separation circuit 5 separates a composite video signal into a luminance signal "CY" and a carrier color signal "CC", when it is input with the composite video signal. A luminance signal "Y" input to the first signal input terminal is fed to an "A" terminal of a first switching device 7, and the luminance signal "CY" output by the YC separation circuit 5 is fed to a "B" terminal. A color difference decoder circuit 6 converts the carrier color signal output "CC", which is output by the YC separation circuit 5, into two color difference signals, a first color difference signal "CC1" and a second color difference signal "CC2". The first color difference signal "CC1" output by the color difference decoder circuit 6 is fed to a "B" terminal of a second switching device 8, and another first color difference signal "C1" input to the second signal input terminal 2 is fed to an "A" terminal of the second switching device 8. The second switching device 8 selects either one of the "C1" and the "CC1", and outputs it to a video signal recording circuit 10. The second color difference signal "CC2" output by the color difference decoder circuit 6 is fed to a "B" terminal of a third switching device 9, and another second color difference signal "C2" input to the third signal input terminal 3 is fed to an "A" terminal of the third switching device 9. The third switching device 9 selects either one of the "C2" and the "CC2", and outputs it to the video signal recording

circuit 10. An input signal switching device 28 selects whether it outputs a signal fed in the first signal input terminal 1 to the YC separation circuit 5 or not. The video signal recording circuit 10 records the signals output from the first, the second and the third switching devices into a recording medium. A signal switching 5 control circuit 4 controls the switching devices 7 through 9 and 28.

In the video signal recording and reproduction device of this exemplary embodiment, if the input video signal is a component video signal, the device inputs a component luminance signal "Y" to the first signal input terminal 1, a first component color difference signal "C1" (e.g. B-Y signal, U signal, I signal, 10 and so on) to the second signal input terminal, and a second component color difference signal "C2" (e.g. R-Y signal, V signal, Q signal, and so on) to the third signal input terminal.

If the video signal input to it is a composite video signal, the device inputs the composite video signal into the first signal input terminal 1, but it does 15 not input any signal to the second signal input terminal 2 and the third signal input terminal 3.

Described first is a case in which the device records the component video signal. The first signal input terminal 1, the second signal input terminal 2 and the third signal input terminal 3 are respectively input with the component 20 luminance signal "Y", the first component color difference signal "C1" and the second component color difference signal "C2".

The signal switching control circuit 4 is operated to select input signals on the "A" side input terminals of the first through the third switching devices 7 through 9, and the "A" side output terminal of the input signal switching 25 device 28. An output of the input signal switching device 28 is open, because no

connection is provided with the "A" side output terminal of the input signal switching device 28.

The first switching device 7, the second switching device 8 and the third switching device 9 output the component luminance signal "Y" input through 5 the first signal input terminal 1, the first component color difference signal "C1" input through the second signal input terminal 2 and the second component color difference signal "C2" input through the third signal input terminal 3 respectively to the video signal recording circuit 10. The video signal recording circuit 10 receives the component luminance signal "Y", the first component color difference 10 signal "C1" and the second component color difference signal "C2", and records these signals in the recording medium.

Described next is a case in which the device records a composite video signal. The video signal input terminal 1 is input with the composite video signal, and the signal switching control circuit 4 is operated to select input signals on the 15 "B" side input terminals of the first through the third switching devices 7 through 9, and an output signal on the "B" side output terminal of the input signal switching device 28.

A common terminal of the input signal switching device 28 is connected to the first signal input terminal 1. The composite video signal input to 20 the first signal input terminal 1 is fed to the YC separation circuit 5 through the input signal switching device 28, and separated into a luminance signal "CY" and a carrier color signal "CC". The separated luminance signal "CY" is forwarded to the "B" side terminal of the first switching device 7. The separated carrier color signal "CC" is converted into a first color difference signal "CC1" and a second 25 color difference signal "CC2" in the color difference decoder circuit 6. The first

color difference signal "CC1" is output to the "B" side terminal of the second switching device 8, and the second color difference signal "CC2" is output to the "B" side terminal of the third switching device 9.

In the manner as described, the video signal recording circuit 10 receives the luminance signal "CY" output by the YC separation circuit 5, and the first color difference signal "CC1" and the second color difference signal "CC2" output by the color difference decoder circuit 6, and records the signals into the recording medium.

As has been described, the video signal recording and reproduction device of this exemplary embodiment requires only three in number of the input terminals. Thus, the device is able to receive the video signal with a smaller number of the input terminals as compared to the four terminals needed by the conventional device, so as to provide an advantage of reducing a number of signal cables within the device.

15

Second exemplary embodiment

A video signal recording and reproduction device of a second exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 2.

20 The video signal recording and reproduction device of this exemplary embodiment is provided with the same structural elements as that of the first exemplary embodiment shown in Fig. 1. It differs in a respect that the common terminal of the input signal switching device 28 is connected to the second signal input terminal 2 in Fig. 2, whereas it is connected to the first signal input terminal 1 25 in Fig. 1.

The circuits operate in the same manner as that of the first exemplary embodiment, in the case of recording the component video signal, and description of which will therefore be skipped.

In the case of recording the composite video signal, the composite 5 video signal is input to the second signal input terminal 2. The signal switching control circuit 4 is operated to select input signals on the "B" side input terminals of the first through the third switching devices 7 through 9, and the "B" side output terminal of the input signal switching device 28.

The video signal recording circuit 10 receives the luminance signal 10 "CY" output by the YC separation circuit 5, and the first color difference signal "CC1" and the second color difference signal "CC2" output by the color difference decoder circuit 6, and records the signals in the recording medium.

As has been described, the video signal recording and reproduction device of this exemplary embodiment requires only three in number of the input 15 terminals. The device is thus able to receive the video signal with a smaller number of the input terminals as compared to the four terminals needed by the conventional device, so as to provide an advantage of reducing a number of signal cables within the device.

According to the foregoing teaching of the first and the second 20 exemplary embodiments, it is needless to note that another circuit can be devised in a such structure that the common terminal of the input signal switching device 28 is connected to the third signal input terminal 3, and the composite video signal is input to the third signal input terminal 3.

As described above, any one of the plurality of input terminals for the 25 component video signal can be used commonly as an input terminal for the

composite video signal, in the video device of the present invention, which is capable of receiving inputs of both the component video signal and the composite video signal.

5

Third exemplary embodiment

A video signal recording and reproduction device of a third exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 3.

In Fig. 1 depicting the first exemplary embodiment, an input impedance of the YC separation circuit 5 connected to the input signal switching device 28 is substantially high as compared to a line impedance connected to it. Therefore, in the case that video signal is the component video signal, a signal on a line connected from the first signal input terminal 1 to the first switching device 7, i.e. the component luminance signal, is not influenced by the YC separation circuit 5, even if the YC separation circuit 5 is connected to the line. Or, the effect is generally small enough to be negligible. Accordingly, it stands to reason that the input signal switching device 28 shown in Fig. 1 and Fig. 2 can be omitted.

Fig. 3 differs from Fig. 1 in a respect that the input signal switching device 28 is omitted in it. The device is composed of the same structural elements other than the above, and all connections among the individual structural elements are the same except for those related to the input signal switching device 28. In other words, in the video signal recording and reproduction device depicted in Fig. 3, the first signal input terminal 1 is connected directly to an input terminal of the YC separation circuit 5 without communicating through the input signal switching device 28, while the same first signal input terminal 1 is also connected to the “A”

side input terminal of the first switching device. In Fig. 3, the same structural elements having the same operational function as those of Fig. 1 are assigned the same reference numerals. Further description about how the device of this exemplary embodiment operates will be omitted, as it is obviously known through 5 the foregoing details.

The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the input terminals. The device is thus able to receive the video signal with a smaller number of the input terminals as compared to the four terminals needed by the conventional device, so as to provide 10 an advantage of reducing a number of signal cables within the device. Furthermore, the device has merit in avoiding use of the input signal switching device 28, as compared to that of the first exemplary embodiment.

Fourth exemplary embodiment

15 A video signal recording and reproduction device of a fourth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 4.

The video signal recording and reproduction device of this exemplary embodiment is composed of the same structural elements as that of Fig. 2 except 20 that the input signal switching device 28 is omitted. All connections among the individual structural elements are identical except for those related to the input signal switching device 28. That is, in the video signal recording and reproduction device as depicted in Fig. 4, the second signal input terminal 2 is connected to an input terminal of the YC separation circuit 5, while it is also connected to the "A" 25 side input terminal of the second switching device 8. In Fig. 4, the same structural

elements having the same operational function as those of Fig. 2 are assigned the same reference numerals. Further description about how the device of this exemplary embodiment operates will be omitted, as it is obvious through the foregoing details.

5 The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the input terminals, thereby giving an advantage of reducing a number of signal cables within the device. Furthermore, the device provides merit in avoiding use of the input signal switching device 28, as compared to that of the second exemplary embodiment.

10 According to the above-described third and fourth exemplary embodiments, another circuit can be composed in the same manner so that the composite video signal is input to the third signal input terminal 3, as it is needless to note.

15 **Fifth exemplary embodiment**

 A video signal recording and reproduction device of a fifth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 5. The video signal recording and reproduction device of Fig. 5 differs from that of Fig. 1 in a respect that the second switching device 8 and the third switching device 9 are omitted in it. The same structural elements having the same operational function as those of Fig. 1 are assigned the same reference numerals.

 An output impedance of the terminal for outputting the first color difference signal “CC1” and an output impedance of the terminal for outputting the second color difference signal “CC2” of the color difference decoder circuit 6 are

substantially high as compared to impedance of respective lines connected thereto, when no signal is being output. Therefore, the first component color difference signal "C1" input to the second signal input terminal 2 and the second component color difference signal "C2" input to the third signal input terminal 3 are not 5 influenced by the color difference decoder circuit 6.

The color difference decoder circuit 6 gives no effect or a negligible effect to the first component color difference signal "C1" and the second component color difference signal "C2", even if the output terminal for the first color difference signal and the output terminal for the second color difference signal of the color 10 difference decoder circuit 6 are connected respectively to the second signal input terminal and the third signal input terminal, as shown in Fig. 5, so long as no input signal is present in the color difference decoder circuit 6.

The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the input terminals, thereby giving an 15 advantage of reducing a number of signal cables within the device. Furthermore, the device provides merit in avoiding use of the switching devices 8 and 9, as compared to the first exemplary embodiment.

Sixth exemplary embodiment

20 A video signal recording and reproduction device of a sixth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 6. The video signal recording and reproduction device of this exemplary embodiment has a circuit structure in which the first switching device 7 and the third switching device 9 are eliminated from that of Fig. 2. The 25 same structural elements having the same operational function as those of Fig. 2 are

assigned the same reference numerals.

Output impedance of the YC separation circuit 5 is substantially high as compared to impedance of a line connected to it, when no signal is being output. Therefore, the component luminance signal input from the first signal input terminal 5 is not influenced by the presence of the YC separation circuit 5.

The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the input terminals, thereby giving an advantage of reducing a number of signal cables within the device. Furthermore, the device provides merit in avoiding use of the switching devices 7 and 9, as compared to the second exemplary embodiment.

According to the foregoing fifth and sixth exemplary embodiments, it is needless to note that another circuit can be composed in the same manner so that the composite video signal may be input to the third signal input terminal 3.

15

Seventh exemplary embodiment

A video signal recording and reproduction device of a seventh exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 7. The video signal recording and reproduction device of this exemplary embodiment has a structure in which the first switching device 7, the second switching device 8 and the third switching device 9 are eliminated from that of Fig. 1. Any structural elements having the same operational function as those of Fig. 1 are assigned the same reference numerals.

As has been described, an output impedance of the YC separation circuit 5 and an output impedance of the color difference decoder circuit 6 are substantially high as compared to impedance of the lines connected to them, when

no signal is being output. Therefore, the first switching device 7, the second switching device 8 and the third switching device 9 can be omitted from the structure of Fig. 1.

The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the input terminals, thereby giving an advantage of reducing a number of signal cables within the device. Furthermore, the device provides merit in avoiding use of the switching devices 7, 8 and 9, as compared to the first exemplary embodiment.

10

Eighth exemplary embodiment

A video signal recording and reproduction device of an eighth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 8. The video signal recording and reproduction device of this exemplary embodiment has a structure in which the first switching device 7, the second switching device 8 and the third switching device 9 are eliminated from that of Fig. 2. Any structural elements having the same operational function as those of Fig. 2 are assigned the same reference numerals.

As has been described, output impedance of the YC separation circuit 5 and the color difference decoder circuit 6 are substantially high as compared to 20 impedance of the lines connected to them, when no signal is being output. Therefore, the first switching device 7, the second switching device 8 and the third switching device 9 can be omitted from the structure of Fig. 1.

The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the input terminals, thereby giving an 25 advantage of reducing a number of signal cables within the device. Furthermore,

the device provides merit in avoiding use of the switching devices 7, 8 and 9, as compared to the second exemplary embodiment.

According to the foregoing seventh and eighth exemplary embodiments, it is needless to note that another circuit can be composed in the same 5 manner so that the composite video signal may be input to the third signal input terminal 3.

Ninth exemplary embodiment

A video signal recording and reproduction device of a ninth exemplary 10 embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 9.

A luminance signal reproduction circuit 12 reproduces a luminance signal "Y" from a recording medium. A first color difference signal reproduction circuit 17 reproduces a first color difference signal "C1" from the recording 15 medium. A second color difference signal reproduction circuit 18 reproduces a second color difference signal "C2" from the recording medium. A color signal encoder circuit 16 receives inputs of the first color difference signal "C1" output by the first color difference signal reproduction circuit 17 and the second color difference signal "C2" output by the second color difference signal reproduction 20 circuit 18, generates a carrier color signal "C", and outputs it to an adder circuit 13. The adder circuit 13 generates and outputs a composite video signal by adding the luminance signal "Y" output by the luminance signal reproduction circuit 12 and the carrier color signal "C" output by the color signal encoder circuit 16.

A switching device 14 receives an output of the luminance signal 25 reproduction circuit 12 at an "A" side terminal and an output of the adder circuit 13

at an "B" side terminal, and outputs either one of the signals by selecting it. A first output amplifier circuit 15 amplifies the output of the switching device 14, and outputs it to a video signal output terminal 21. The video signal output terminal 21 outputs the output signal of the first output amplifier circuit 15 from the video signal recording and reproduction device. A second output amplifier circuit 19 amplifies the output signal of the first color difference signal reproduction circuit 17. A first color difference signal output terminal 22 outputs the output signal of the second output amplifier circuit 19 from the video signal recording and reproduction device. A third output amplifier circuit 20 amplifies the output signal of the second color difference signal reproduction circuit 18. A second color difference signal output terminal 23 outputs the output signal produced by the third output amplifier circuit 20 from the video signal recording and reproduction device. An output signal switching control circuit 11 switches the signal output from the video signal output terminal 21 by controlling the switching device 14.

15 Described hereinafter is a case in which a component video signal is output from the video signal recording and reproduction device of this exemplary embodiment. The output signal switching control circuit 11 is operated to select the "A" side input terminal of the fifth switching device 14. A component luminance signal "Y" is output from the video signal output terminal 21. The first 20 color difference signal "C1" output by the first color difference signal reproduction circuit 17 passes through the second output amplifier circuit 19, and is output from the first color difference signal output terminal 22, as a first component color difference signal. In the like manner, the second component color difference signal "C2" is output by the second color difference signal reproduction circuit 18, 25 passes through the third output amplifier circuit 20, and is output from the second

color difference signal output terminal 23.

Described next is a case in which a composite video signal is output from the video signal recording and reproduction device of this exemplary embodiment. The output signal switching control circuit 11 is operated to select

- 5 the "B" side input terminal of the switching device 14. The color signal encoder circuit 16 receives inputs of the first color difference signal "C1" output by the first color difference signal reproduction circuit 17 and the second color difference signal "C2" output by the second color difference signal reproduction circuit 18, converts them into a carrier color signal "C", and outputs it to the adder circuit 13.
- 10 The adder circuit 13 generates and outputs a composite video signal "CV" by adding the luminance signal "Y" output by the luminance signal reproduction circuit 12 and the carrier color signal "C" output by the color signal encoder circuit 16. The composite video signal "CV" generated here passes through the fifth switching device 14 and the first output amplifier circuit 15, and is output from the
- 15 video signal output terminal 21.

From the foregoing, it will be seen that the video signal recording and reproduction device of this exemplary embodiment makes use of the video signal output terminal 21 as a component luminance signal output terminal when it outputs a component video signal, or, as a composite video signal output terminal when it

- 20 outputs a composite video signal.

In other words, the video signal recording and reproduction device of this exemplary embodiment unifies the component luminance signal output terminal and the composite video signal output terminal.

As has been described, the video signal recording and reproduction

- 25 device of this exemplary embodiment requires only three in number of the output

terminals. Thus, the device is able to output the video signal with a smaller number of the output terminals than the conventional four terminals, so as to provide an advantage of reducing a number of signal cables and a number of output amplifiers in the device.

5

Tenth exemplary embodiment

A video signal recording and reproduction device of a tenth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 10.

10 The video signal recording and reproduction device of this exemplary embodiment differs from that of the ninth exemplary embodiment in a respect that an output of the first color difference signal reproduction circuit 17 is connected to the "A" side input terminal of the switching device 14, an output of the adder circuit 13 is connected to the "B" side input terminal, and an input terminal of the second 15 output amplifier circuit is connected to a common terminal of the switching device 14.

In this exemplary embodiment, the video signal output terminal 22 is utilized as a first component color difference signal output terminal when the video signal output terminal 22 outputs a component video signal. Also, the video signal 20 output terminal 22 is utilized as a composite video signal output terminal when the video signal output terminal 22 outputs a composite video signal.

The video signal recording and reproduction device of this exemplary embodiment operates in the same manner as that of the ninth exemplary embodiment, and description of which will therefore be skipped. The video signal 25 recording and reproduction device of this exemplary embodiment requires only

three in number of the output terminals. Thus, the device is able to output the video signal with a smaller number of the output terminals than the conventional four terminals, so as to provide an advantage of reducing a number of signal cables and a number of output amplifiers in the device.

5 Based on the foregoing ninth and the tenth exemplary embodiments, another circuit can be devised in a such structure that an output of the second color difference signal reproduction circuit 18 is connected to the "A" side input terminal of the switching device 14, an output of the adder circuit 13 is connected to the "B" side input terminal, and the input terminal of the third output amplifier circuit 20 is
10 connected to the common terminal of the switching device 14, as it is needless to mention.

Eleventh exemplary embodiment

A video signal recording and reproduction device of an eleventh
15 exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 11.

In Fig. 11, all of the structural elements, except for a switch 27, are identical to those of the ninth exemplary embodiment. Since the structural elements carrying the same reference numerals operate in the same manner, their
20 description will be skipped.

Described hereinafter is a case in that a composite video signal is output. The output signal switching control circuit 11 is operated to turn on the switch 27. The adder circuit 13 generates a composite video signal by adding a luminance signal "Y" output by the luminance signal reproduction circuit 12 and a
25 carrier color signal "C" output by the color signal encoder circuit 16. The

composite video signal is amplified by the first output amplifier circuit 15, and is output from the video signal output terminal 21.

Described now is a case in which a component video signal is output.

The output signal switching control circuit 11 is operated to turn off the switch 27.

- 5 Since the carrier color signal is not supplied to the adder circuit 13, the output signal from the luminance signal reproduction circuit 12 passes through the adder circuit 13 without being added up, and is output as the component luminance signal from the video signal output terminal 21, after amplified by the first output amplifier circuit 15.
- 10 A first component color difference signal "C1" is output from the first color difference signal reproduction circuit 17, amplified by the second output amplifier circuit 19, and is then output from the first color difference signal output terminal 22.

In the like manner, a second component color difference signal "C2" is

- 15 output by the second color difference signal reproduction circuit 18, amplified by the third output amplifier circuit 20, and is output from the second color difference signal output terminal 23.

The video signal recording and reproduction device of this exemplary embodiment requires only three in number of the output terminals. Thus, the device is able to output the video signal with a smaller number of the output terminals as compared to the conventional four terminals, thereby having an advantage of reducing a number of signal cables and a number of output amplifiers in the device.

A video signal recording and reproduction device of a twelfth exemplary embodiment of the present invention will be described hereinafter by referring to a block diagram of Fig. 12.

The video signal recording and reproduction device of this exemplary embodiment differs from that of the eleventh exemplary embodiment in a respect that two switches 27a and 27b are provided at an input side of the color difference encoder circuit in Fig. 12, whereas the switch 27 is provided at an output side of the color difference encoder circuit in Fig. 11. All of the other structural elements are identical to those of the tenth exemplary embodiment. Since the structural elements carrying the same reference numerals operate in the same manner, their description will be skipped.

Described hereinafter is a case in that a composite video signal is output. The output signal switching control circuit 11 is operated to turn on the switches 27a and 27b. The adder circuit 13 generates a composite video signal by adding a luminance signal "Y" output by the luminance signal reproduction circuit 12 and a carrier color signal "C" output by the color signal encoder circuit 16. The composite video signal is amplified by the first output amplifier circuit 15, and is output from the video signal output terminal 21.

Described now is a case in which a component video signal is output.

20 The output signal switching control circuit 11 is operated to turn off the switches 27a and 27b. Since the carrier color signal is not supplied to the adder circuit 13, the output signal from the luminance signal reproduction circuit 12 passes through the adder circuit 13 without being added up, and it is output as the component luminance signal from the video signal output terminal 21, after amplified by the

25 first output amplifier circuit 15.

A first component color difference signal "C1" is output from the first color difference signal reproduction circuit 17, amplified by the second output amplifier circuit 19, and is then output from the first color difference signal output terminal 22.

5 In the like manner, a second component color difference signal "C2" is output by the second color difference signal reproduction circuit 18, amplified by the third output amplifier circuit 20, and is output from the second color difference signal output terminal 23.

The video signal recording and reproduction device of this exemplary 10 embodiment requires only three in number of the output terminals. Thus, the device is able to output the video signal with a smaller number of the output terminals as compared to the conventional four terminals, thereby having an advantage of reducing a number of signal cables and a number of output amplifiers in the device.

15

INDUSTRIAL APPLICABILITY

As has been described, the present invention provide an expedient advantage of making a video signal recording and reproduction device capable of inputting and outputting both component video signal and composite video signal 20 with a reduced number of input/output connectors, thereby realizing a reduction in size, a reduction in cost, as well as a reduction of power consumption.

In addition, it goes without mentioning that the device provides even greater effectiveness, when it employs a combination of any of the switching schemes for video input signal described in the first through eighth exemplary 25 embodiments, together with another one of the switching schemes for video output

signal described in the ninth through twelfth exemplary embodiments.

Although the switching schemes for output signal described in the ninth through twelfth exemplary embodiments have been represented by the video signal recording and reproduction device, they are adaptable to video signal 5 reproduction devices not equipped with a recording function.

Although the foregoing exemplary embodiments have been described in the structure of hardware circuits, all or a part of the function of the structural elements can be realized by a software, except for the terminals. Furthermore, the present invention can be embodied in a variety of modified forms. Accordingly, it 10 should be understood that all modifications falling within the true spirit and scope of this invention are covered by the appended claims.

AMENDMENTS UNDER ARTICLE 19**What is claimed is:**

1 1. (Amended) A video signal recording and reproduction device
2 comprising:
3 a first signal input terminal for inputting a luminance signal;
4 a second signal input terminal for inputting a first color difference
5 signal;
6 a third signal input terminal for inputting a second color difference
7 signal;
8 a YC separation means for separating another luminance signal and a
9 carrier color signal from a composite video signal, and outputting said separated
10 signals; and
11 a color difference decoding means for inputting said carrier color
12 signal output by said YC separation means, and decoding and outputting another
13 first color difference signal and another second color difference signal,
14 wherein one terminal among said first signal input terminal, said
15 second signal input terminal and said third signal input terminal is used commonly
16 as a composite video signal input terminal.

1 2. (Amended) A video signal reproduction device comprising:
2 a luminance signal reproduction means for reproducing a luminance
3 signal from a recording medium;
4 a first color difference signal reproduction means for reproducing a
5 first color difference signal from the recording medium;

6 a second color difference signal reproduction means for reproducing a
7 second color difference signal from the recording medium;

8 a color signal encoding means for converting said first color difference
9 signal output from said first color difference signal reproduction means and said
10 second color difference signal output from said second color difference signal
11 reproduction means into a carrier color signal;

12 an adding means for adding said luminance signal output of said
13 luminance signal reproduction means and said carrier color signal of said color
14 signal encoding means, and outputting a composite video signal;

15 a luminance signal output terminal;

16 a first color difference signal output terminal; and

17 a second color difference signal output terminal,

18 wherein said luminance signal output terminal is used commonly as a
19 composite video signal output terminal.

1 3. (Deleted)

1 4. (Amended) The video signal recording and reproduction device
2 according to claim 1, further comprising:

3 a first switching means for inputting said luminance signal input from
4 said first signal input terminal and said another luminance signal output by said YC
5 separation means, and outputting one of said signals input therein;

6 a second switching means for inputting said first color difference
7 signal input from said second signal input terminal and said another first color
8 difference signal output by said color difference decoding means, and outputting

9 one of said signals input therein;

10 a third switching means for inputting said second color difference

11 signal input from said third signal input terminal and said another second color

12 difference signal output by said color difference decoding means, and outputting

13 one of said signals input therein; and

14 a signal switching control means for outputting a signal for switching

15 outputs of said first switching means, said second switching means and said third

16 switching means.

1 5. The video signal recording and reproduction device according to

2 claim 4, further comprising a switching means connected between said one terminal

3 commonly used as a composite video signal input terminal and an input terminal of

4 said YC separation means, for performing an ON/OFF operation according to said

5 signal output by said signal switching control means.

1 6. The video signal recording and reproduction device according to

2 claim 4, wherein said one terminal commonly used as a composite video signal

3 input terminal is connected directly to an input terminal of said YC separation

4 means.

1 7. (Amended) The video signal recording and reproduction device

2 according to claim 1, further comprising:

3 an input signal switching means provided between said one terminal

4 commonly used as a composite video signal input terminal and an input terminal of

5 said YC separation means;

6 a switching means for inputting a component video signal input in said
7 one terminal commonly used as a composite video signal input terminal and one of
8 an output signal of said YC separation means and an output signal of said color
9 difference decoding means, and outputting one of the signals input therein; and
10 a signal switching control means for outputting a signal for switching
11 said input signal switching means and said switching means.

1 8. (Amended) The video signal recording and reproduction device
2 according to claim 1, further comprising:

3 an input signal switching means for selecting one, where a signal input
4 in said one terminal commonly used as a composite video signal input terminal is
5 output to, between said YC separation means and a video signal recording means;
6 and

7 a signal switching control means for outputting a signal for switching
8 said input signal switching means.

1 9. (Amended) The video signal reproduction device according to claim
2, further comprising:

3 a switching means for inputting an output of said adding means and an
4 output signal from among said luminance signal reproduction means, said first color
5 difference signal reproduction means and said second color difference signal
6 reproduction means, and outputting one of the signals input therein; and

7 an output signal switching control means for controlling said
8 switching means.

1 10. (Amended) The video signal reproduction device according to
2 claim 2, further comprising:

3 a switch means provided between an output terminal of said color
4 signal encoding means and an input terminal of said adding means for determining
5 whether to add or not to add the carrier color signal of said color signal encoding
6 means; and

7 an output signal switching control means for controlling said switch
8 means.

1 11. (Amended) The video signal reproduction device according to
2 claim 2, further comprising:

3 a first switch means provided between an output terminal of said first
4 color difference signal reproduction means and an input terminal of said color
5 signal encoding means, for turning on and off an output signal of said first color
6 difference signal reproduction means;

7 a second switch means provided between an output terminal of said
8 second color difference signal reproduction means and an input terminal of said
9 color signal encoding means, for turning on and off an output signal of said second
10 color difference signal reproduction means; and

11 an output signal switching control means for controlling said first
12 switch means and said second switch means.

1 12. (Deleted)

1 13. (Added) The video signal reproduction device according to claim

- 2 2, further comprising a means for controlling whether to add or not to add the
- 3 carrier color signal output by said color signal encoding means.

ABSTRACT OF THE DISCLOSURE

A video signal recording and reproduction device of this invention uses one of a plurality of terminals for receiving input of component video signal to also serve as a composite video signal input terminal, thereby reducing a number of 5 the input terminals. This realizes a reduction in size of the device, yet maintains the device to be capable of receiving both inputs of component video signal and composite video signal. The video signal recording and reproduction device of this invention also uses one of a plurality of terminals for outputting component video signal to also serve as a composite video signal output terminal, thereby 10 reducing a number of the output terminals. This realizes a further reduction in size of the device, yet maintains the device to be capable of providing both outputs of component video signal and composite video signal.

Reference Numerals

1 First signal input terminal
2 Second signal input terminal
3 Third signal input terminal
5 4 Signal switching control circuit
5, 135 YC separation circuit
6, 136 Color difference decoder circuit
7, 8, 9, 14, 137, 138, 139 Switching device
10 10, 140 Video signal recording circuit
11 Output signal switching control circuit
12, 142 Luminance signal reproduction circuit
13, 143 Adder circuit
15 15, 145 First output amplifier circuit
16, 146 Color signal encoder circuit
17 First color difference signal reproduction circuit
18 Second color difference signal reproduction circuit
19, 149 Second output amplifier circuit
20, 150 Third output amplifier circuit
21 Video signal output terminal
20 22 First color difference signal output terminal
23 Second color difference signal output terminal
27, 27A, 27B Switch
28 Input signal switching device
134 Input signal switching control circuit

147 B-Y signal reproduction circuit

148 R-Y signal reproduction circuit

154 Fourth output amplifier circuit

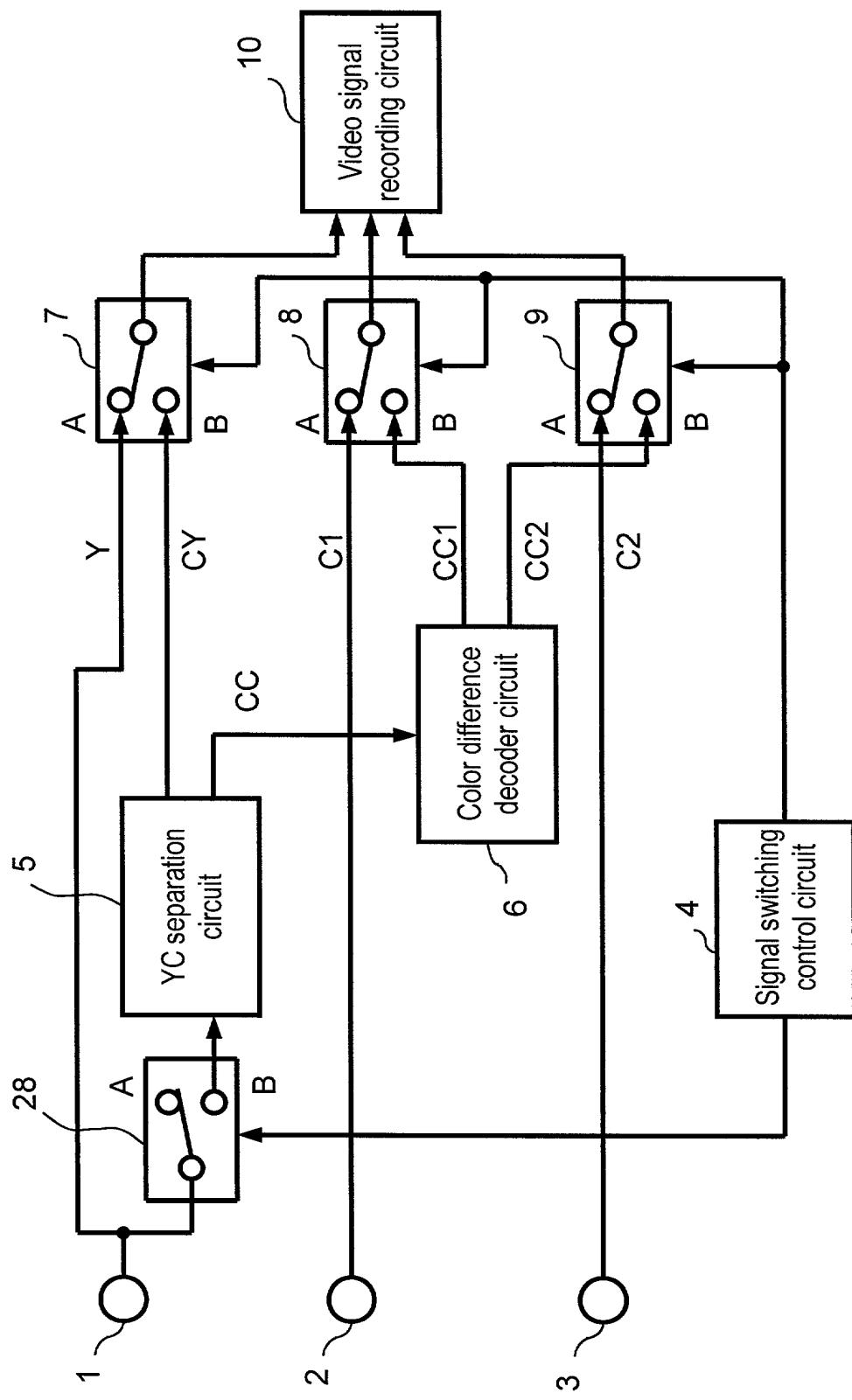


FIG. 1

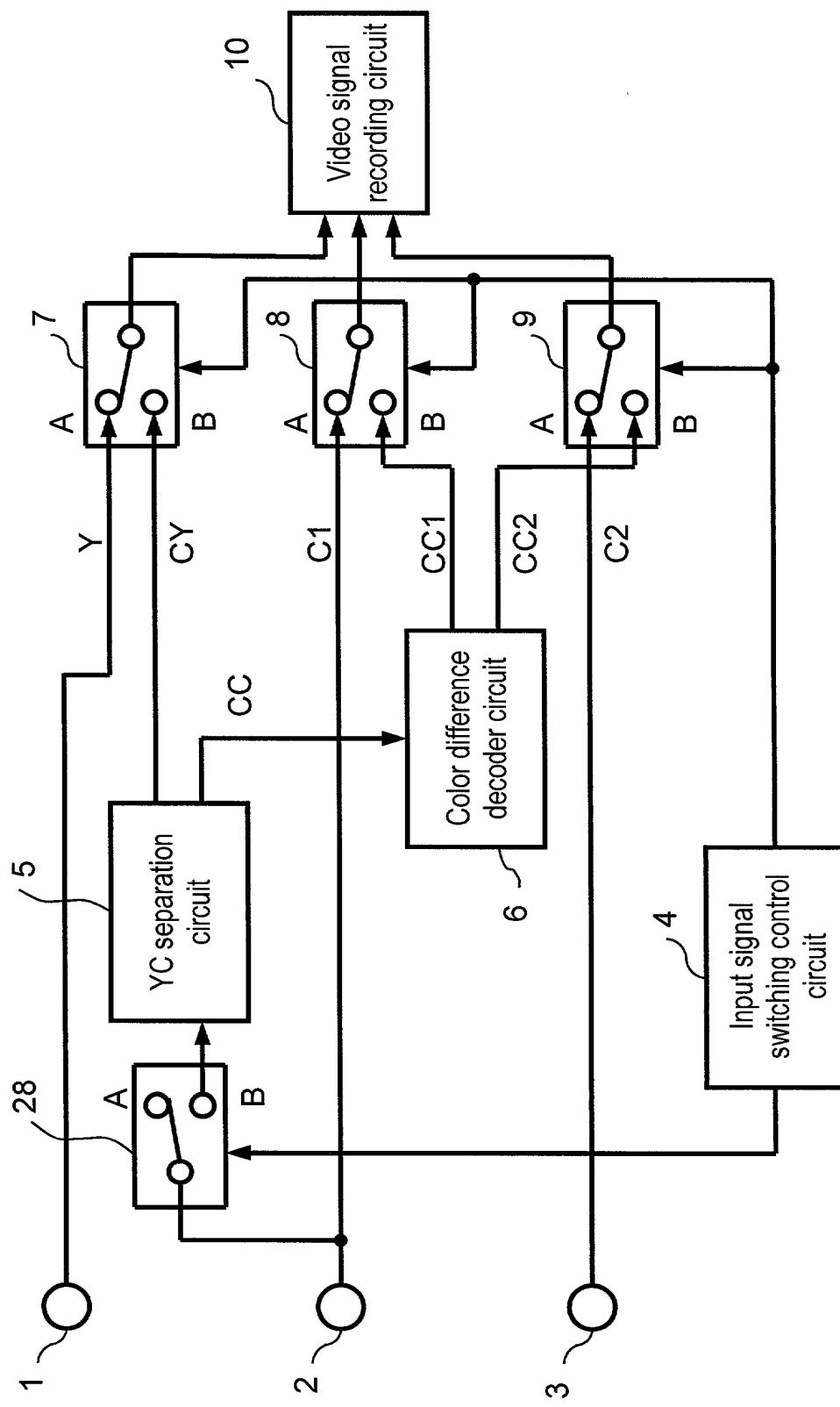


FIG. 2

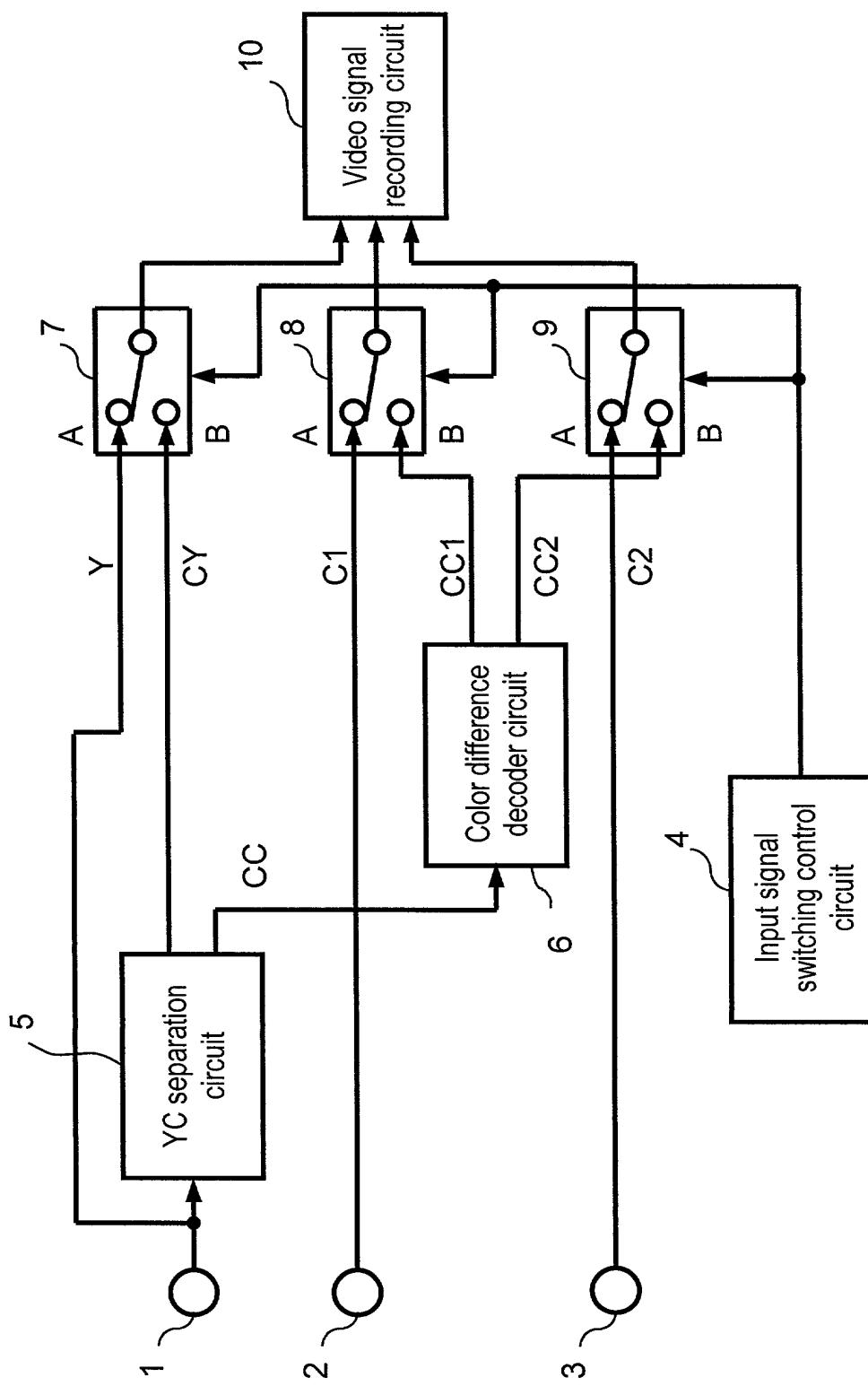


FIG. 3

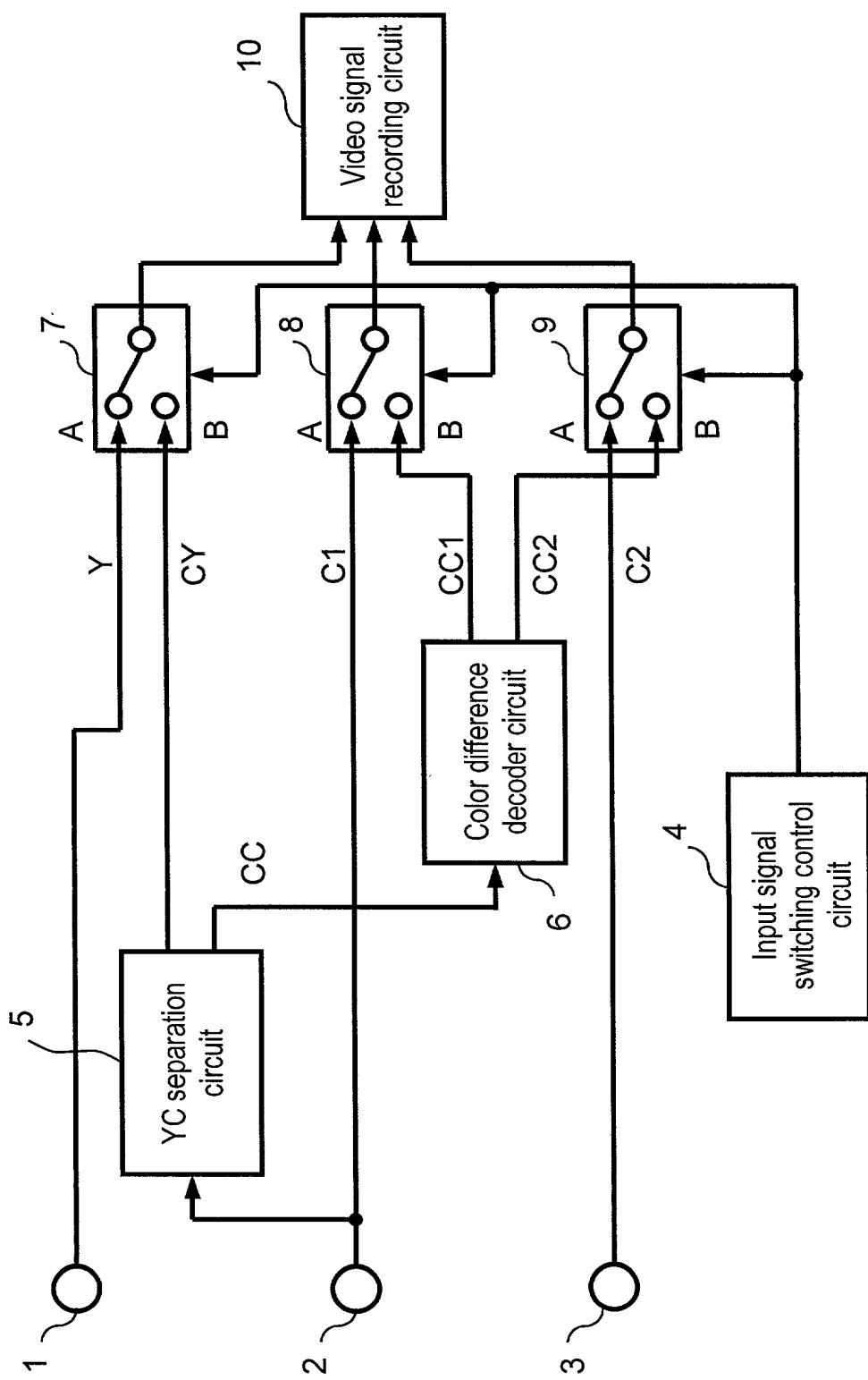


FIG. 4

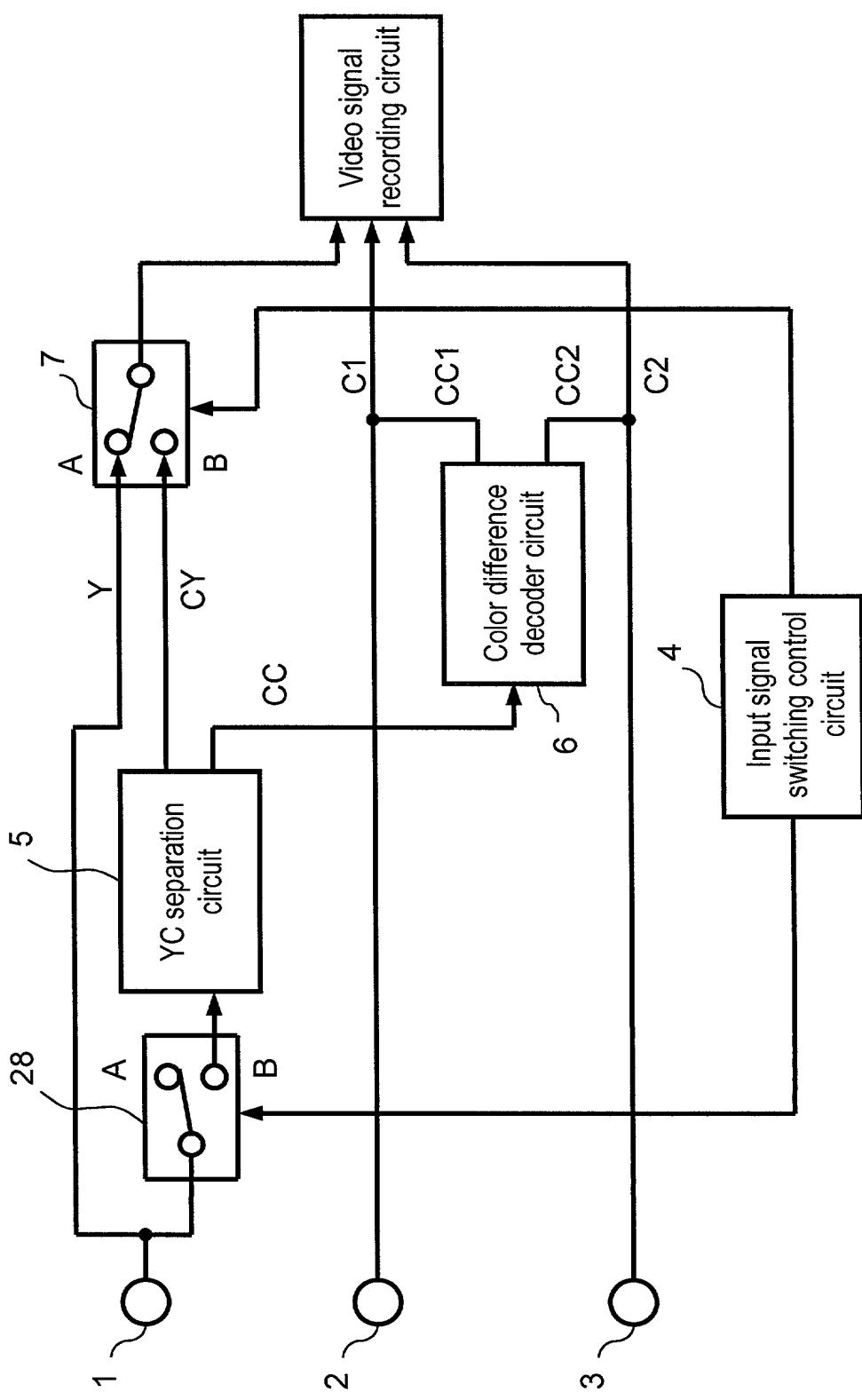


FIG. 5

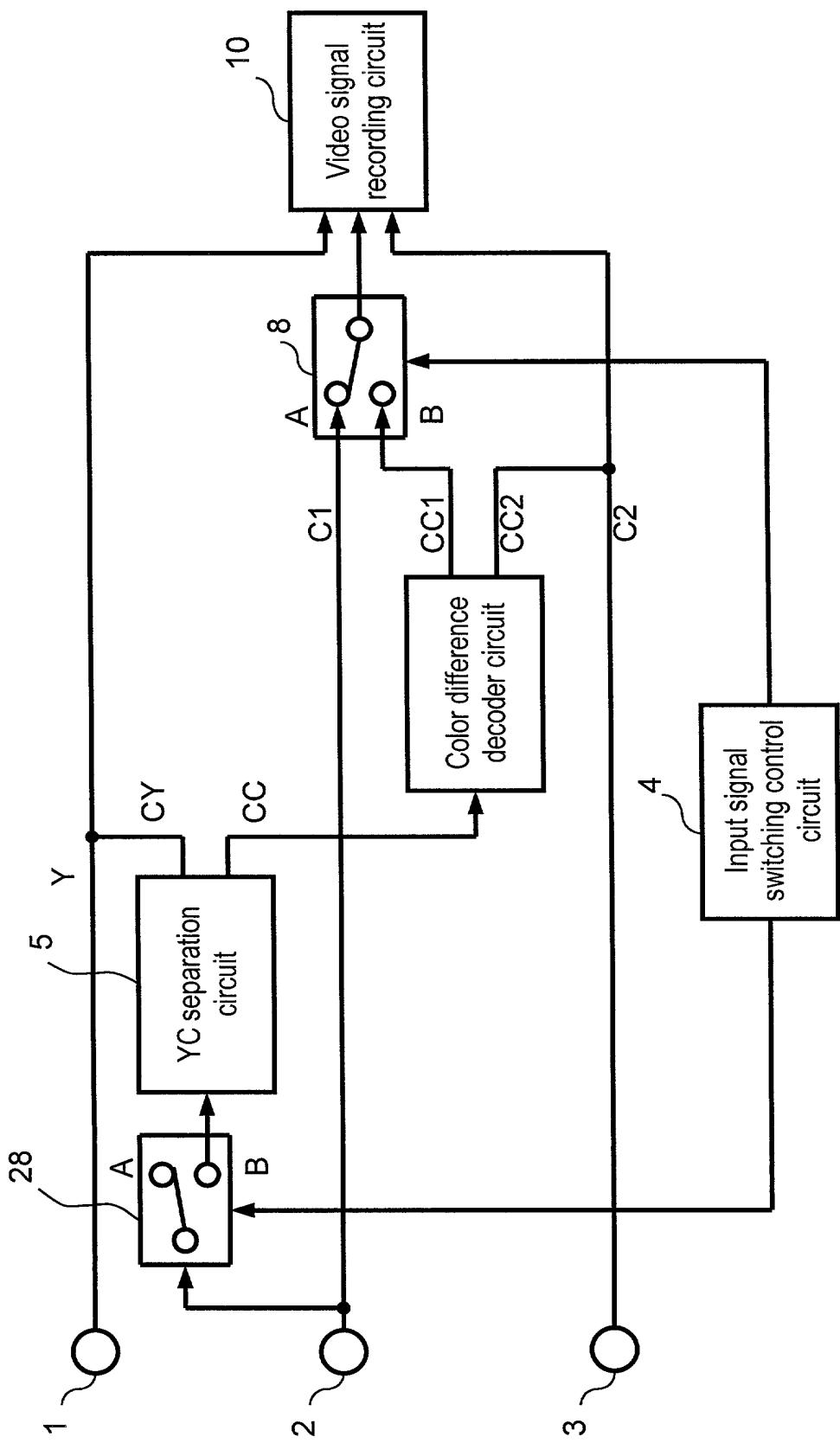


FIG. 6

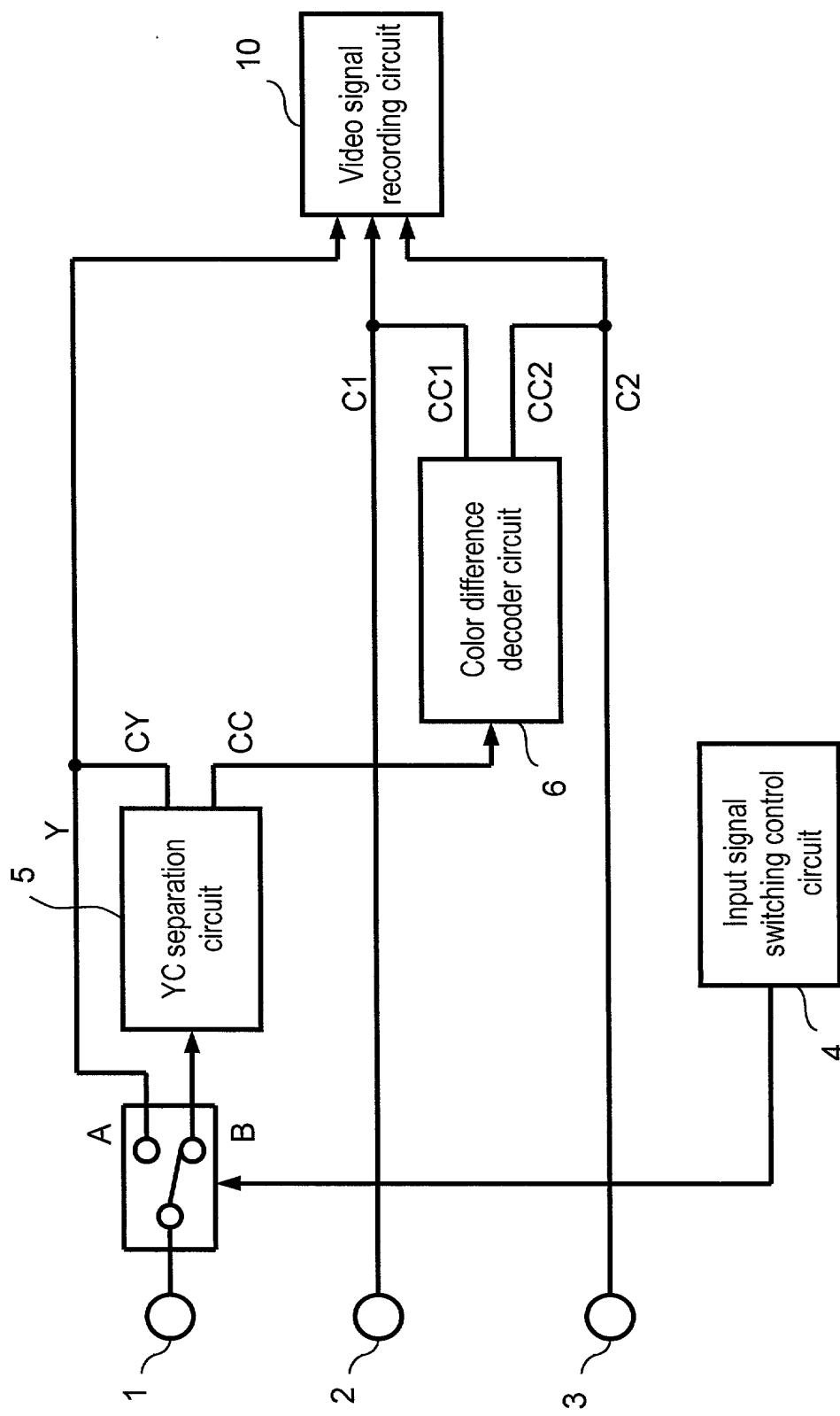


FIG. 7

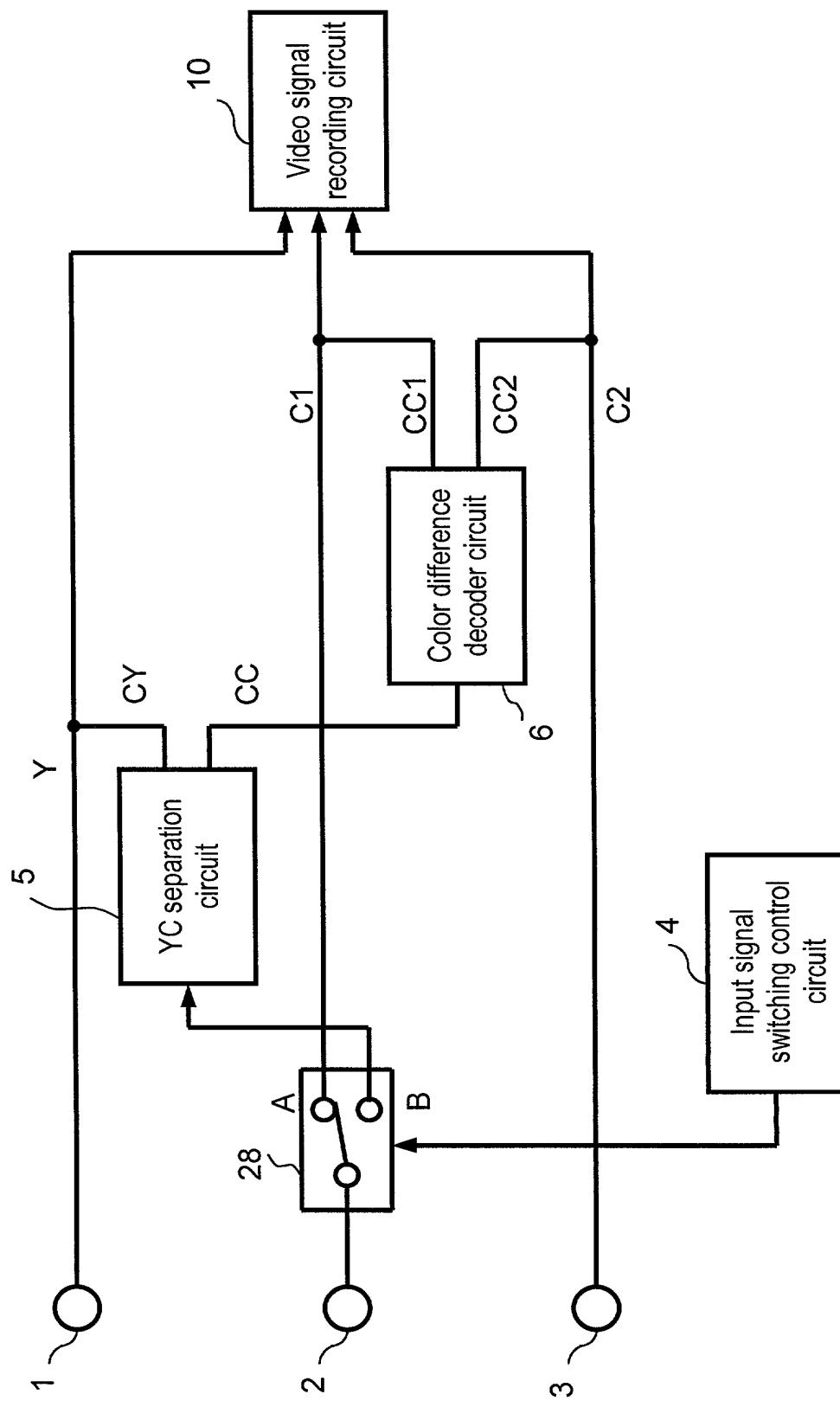


FIG. 8

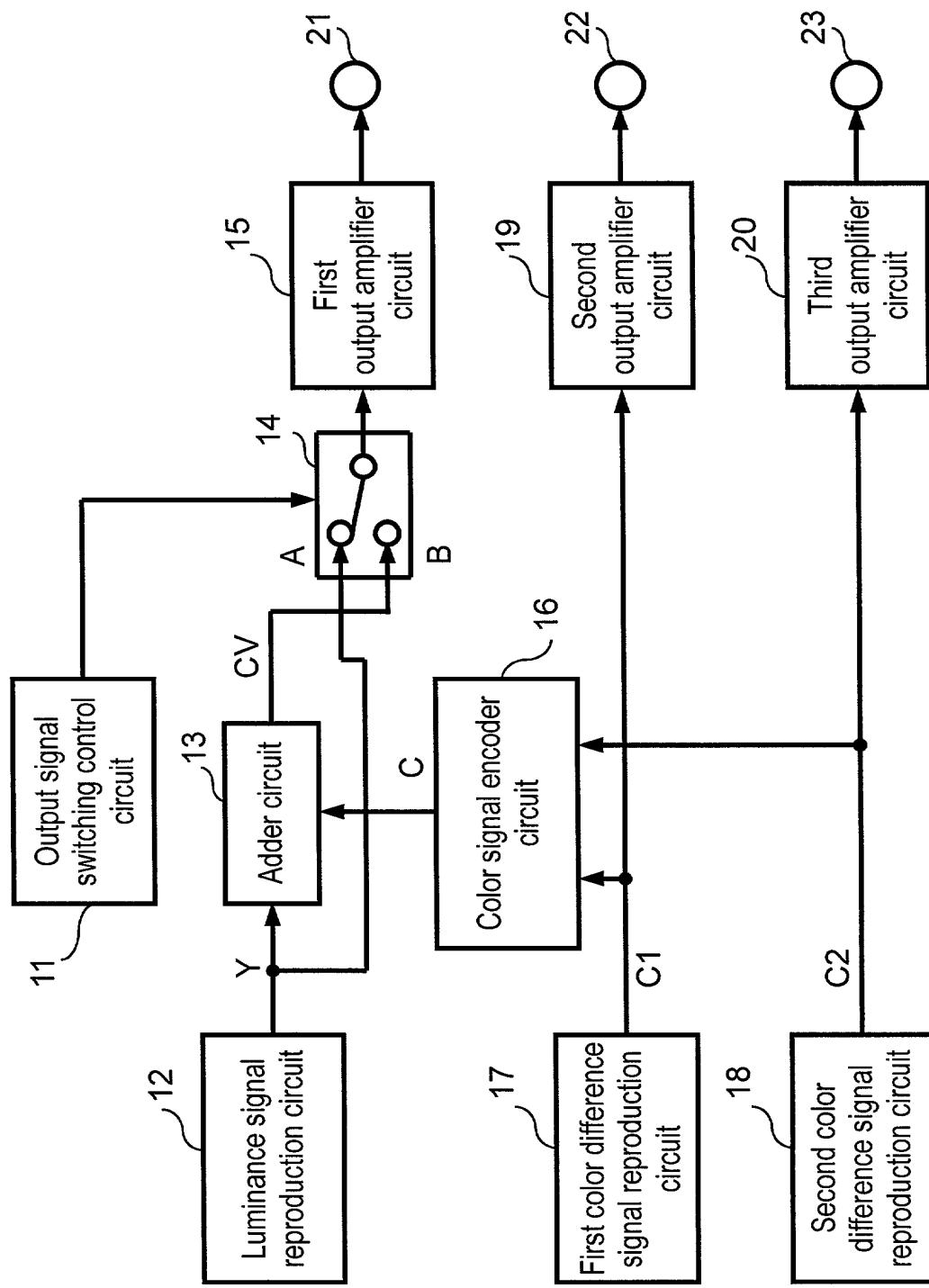


FIG. 9

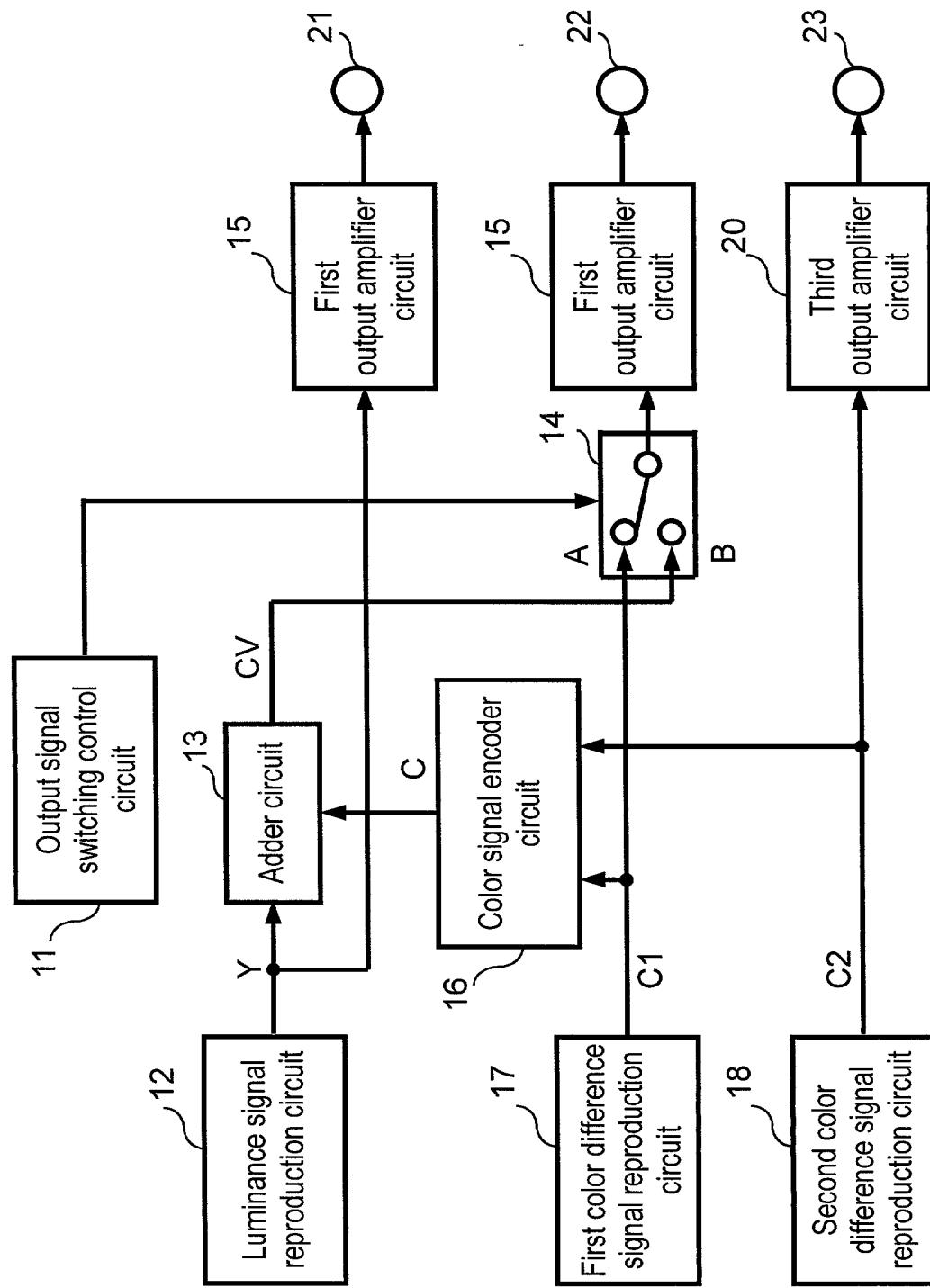


FIG. 10

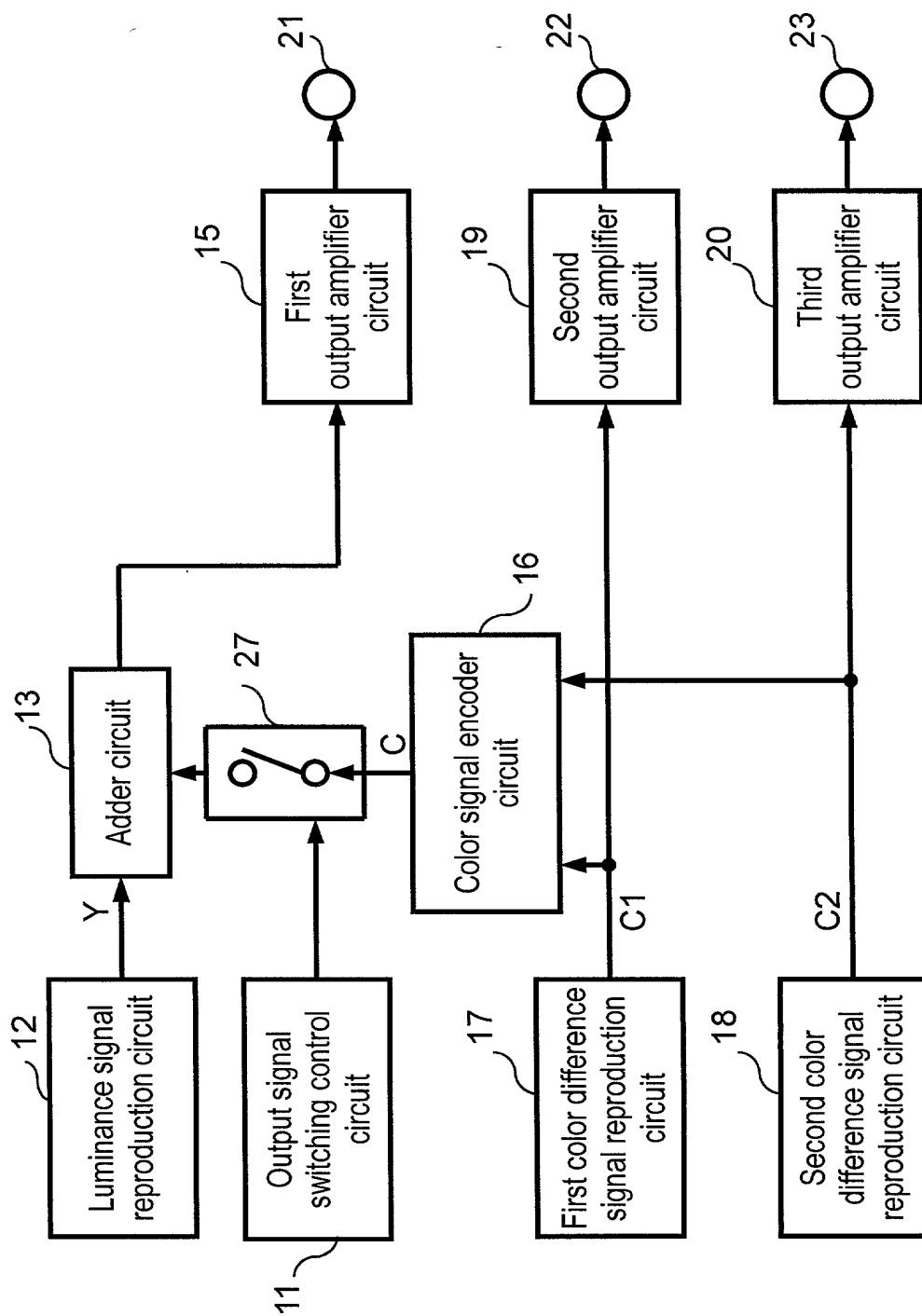


FIG. 11

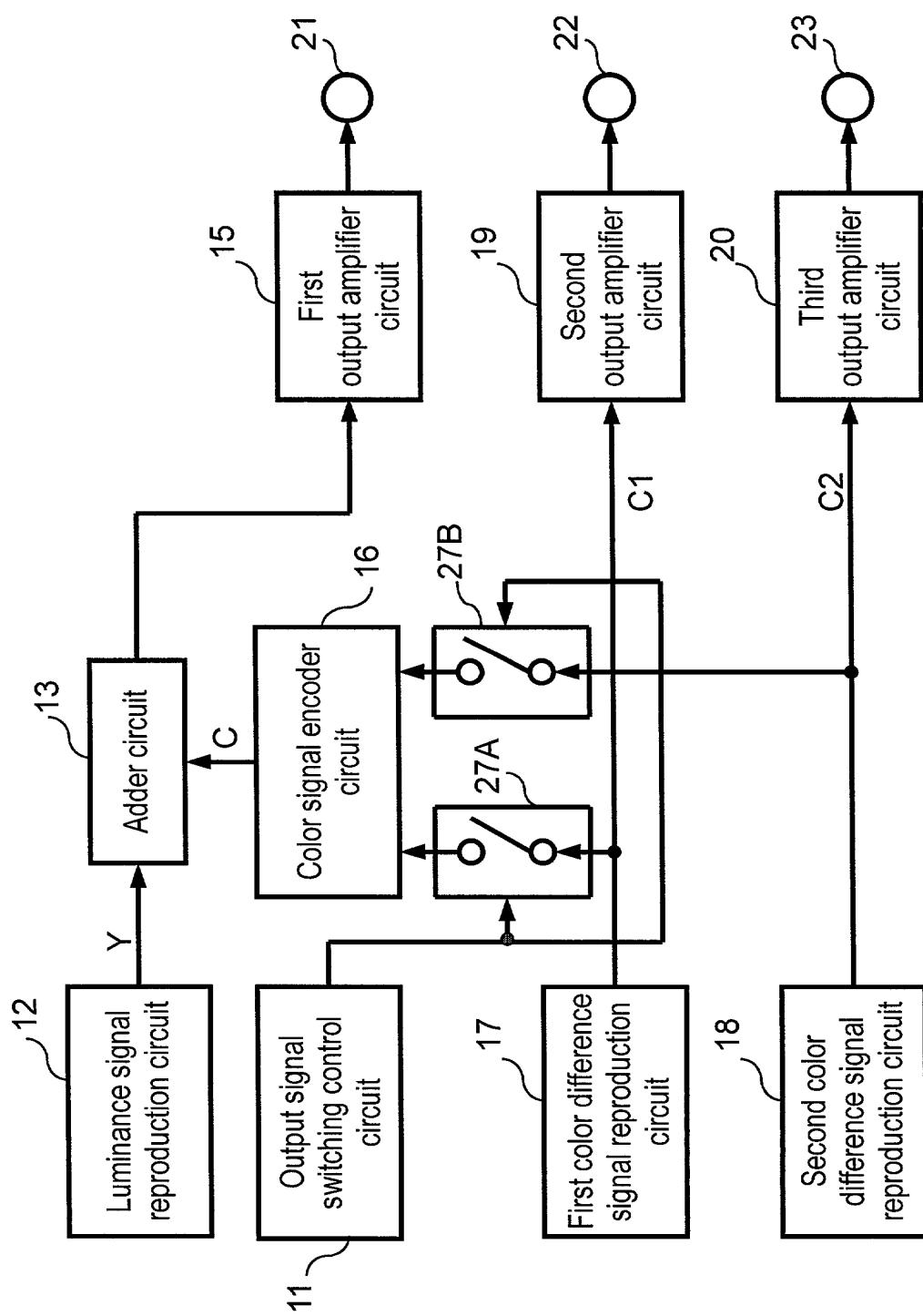


FIG. 12

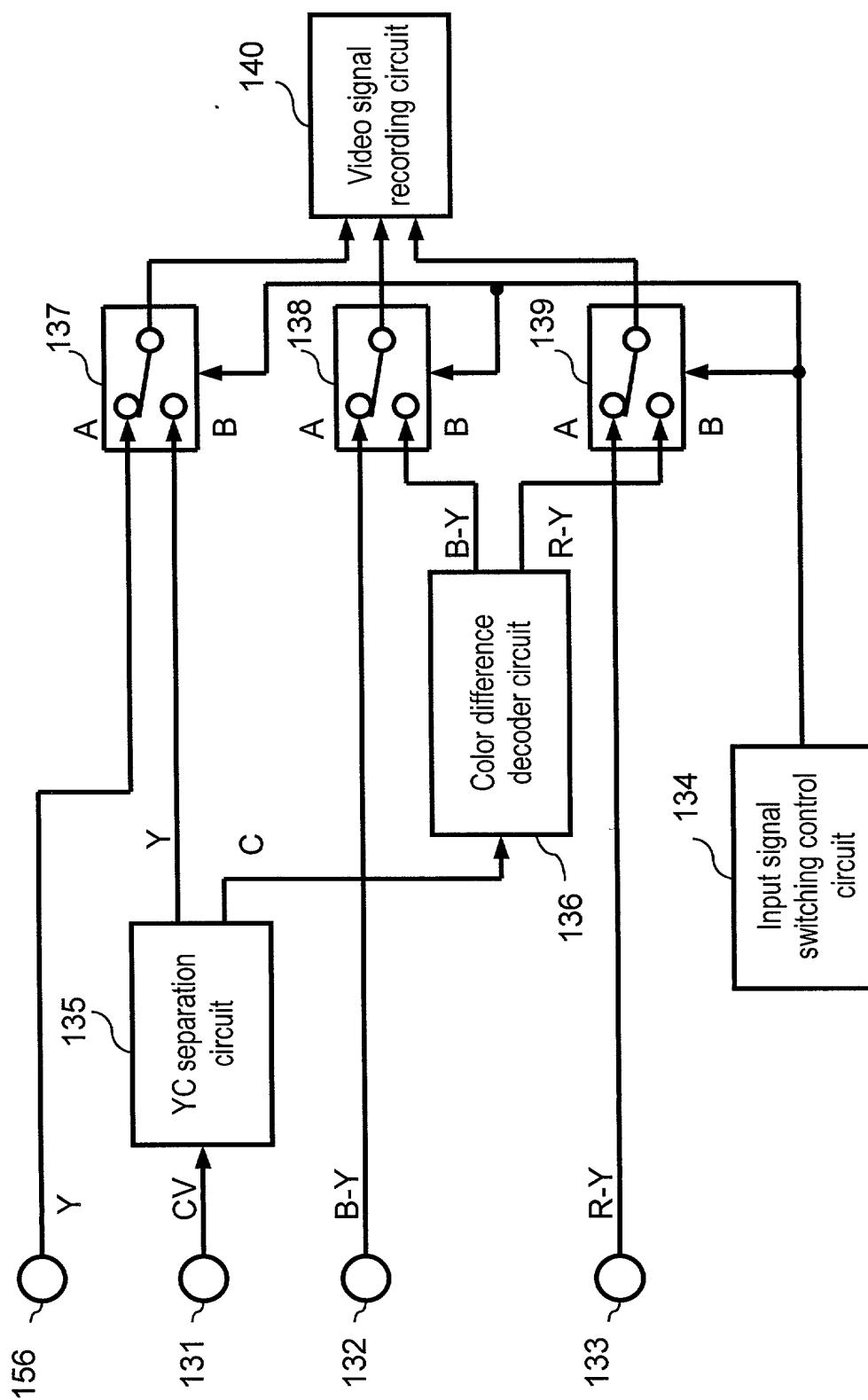


FIG. 13

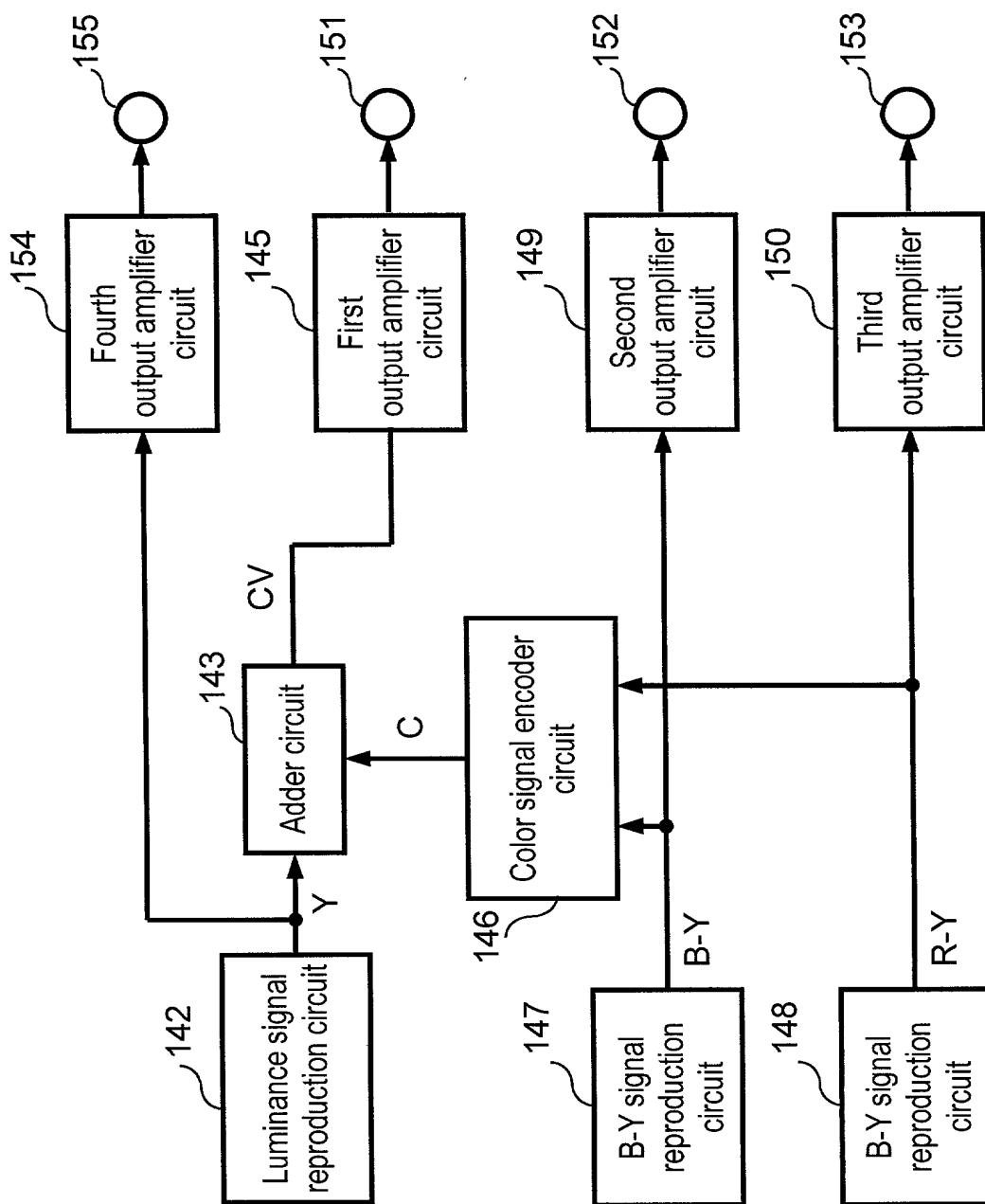


FIG. 14

Reference numerals

- 1 First signal input terminal
- 2 Second signal input terminal
- 3 Third signal input terminal
- 4 Signal switching control circuit
- 5 YC separation circuit
- 6 Color difference decoder circuit
- 7, 8, 9, 14, Switching device
- 10 Video signal recording circuit
- 11 Output signal switching control circuit
- 12 Luminance signal reproduction circuit
- 13 Adder circuit
- 15 First output amplifier circuit
- 16 Color signal encoder circuit
- 17 First color difference signal reproduction circuit
- 18 Second color difference signal reproduction circuit
- 19 Second output amplifier circuit
- 20 Third output amplifier circuit
- 21 Video signal output terminal
- 22 First color difference signal output terminal
- 23 Second color difference signal output terminal
- 27, 27A, 27B Switch
- 28 Input signal switching device

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

VIDEO SIGNAL RECORDING AND REPRODUCTION DEVICE AND VIDEO SIGNAL REPRODUCTION DEVICE

the specification of which is attached hereto unless the following box is checked:



was filed on June 26, 1998 as

United States Application Number or PCT International Application Number PCT/JP98/02882
December 1, 1998, June 15, 1999 and December 27, 1999
 and was amended on (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. §119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Not Claimed

<u>9-171399</u>	<u>Japan</u>	<u>27 June 1997</u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
<u> </u>	<u> </u>	<u> </u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

 (Application Number) (Filing Date)

 (Application Number) (Filing Date)

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Number)

(Filing Date)

(Status - patented, pending, abandoned)

(Application Number)

(Filing Date)

(Status - patented, pending, abandoned)

18

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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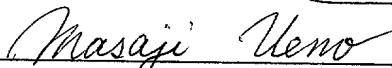
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor (given name, family name) Masaji Ueno

Inventor's signature



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